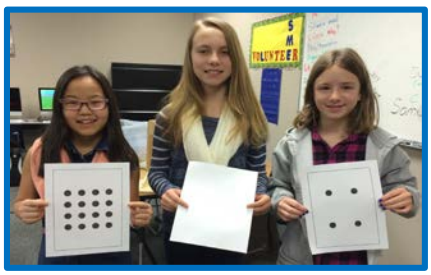
CS Unplugged: Encourage Computing without Computers

Cyndi Rader, crader@mines.edu
Tracy Camp, tcamp@mines.edu
Wendy DuBow, wendy@ncwit.org
Tim Bell, tim.bell@canterbury.ac.nz

http://csunplugged.mines.edu/

CS Unplugged Activities: Fun, kinesthetic activities to teach fundamental computer concepts developed by Tim Bell. Researchers at Colorado School of Mines selected and extended activities to be suitable for middle school classrooms.



Full Lesson Plans:

Lesson Plans at Mines Include :
Exciting hands on activities
Practice sheets that reinforce concepts
Assessments that measure understanding

Proven Successful :
CS Unplugged activities have been used to increase student interest in computer science and teach computational thinking skills. Most teachers who used the CS Unplugged lesson plans reported that they felt comfortable deploying the activities and would likely use them again.

binary numbers

cryptography

minimal spanning tree

CS Unplugged Topics at Mines Include:

Representing Information	Algorithms and Problem Solving	Interacting With Computers
Binary Numbers	Minimal Spanning Trees	Artificial Intelligence
Error Detection	Nim	Computer Vision
Image Representation	Representing Information	Finite State Automata
Cryptography	Binary Search	
20 Questions	Sorting	

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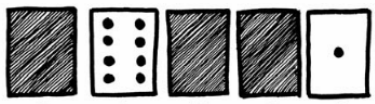
Binary Numbers: Lesson Plan Snapshot

Introduction
Interactive Demo

Binary to Decimal Conversion

Each card has a number of bits on it. We just need to read off the number of dots that are showing to determine what number is represented. When a binary number card is **not** showing, it is represented by a zero. When it **is** showing, it is represented by a one. This is the binary number system.

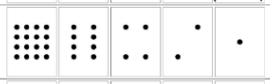
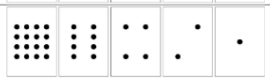
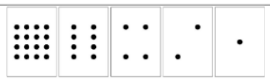
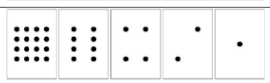
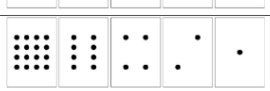
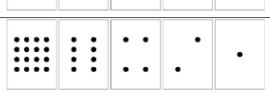


Ask the children to make 01001. What number is this in decimal? [**answer**: 9] Try a few more until they understand the concept. Examples: What would be 6 in binary? [**answer**: 00110] 17? [**answer**: 10001] 20? [**answer**: 10100]

Guided Practice

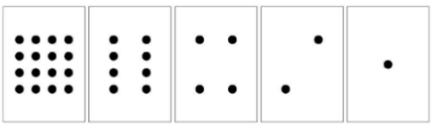
Worksheet 1: Binary Numbers

Represent each normal number by crossing out the cards you do not want to use. Then convert each set of cards into strings of 1's and 0's!

Number		Binary Number
2		00010
5		
3		
12		
19		
8		
15		

Assessment

Worksheet 3: Check Your Understanding



1. What is the next number in the sequence?

   00001 00010 00011 00100 _____

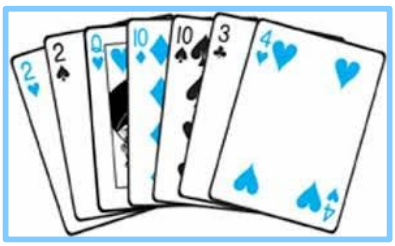
2. What decimal number is represented by 01011?

3. How would you write the number 20 in binary?

4. What is the largest number you can represent using five cards (i.e., five bits)?

5. What is the largest number you could represent if you had only three cards?

6. How many cards (bits) would you need to represent the number 63?



Enrichment
Binary Go Fish