

Subject: Mathematics

Topic: Numbers and Counting

Subtopic: The conversion of a number from binary system to denary system

Level: S.1

Background information:

This is the beginning of the fourth lesson in this topic. Students have just learnt the binary system in Lesson 3.

Learning objective:

1. Content:

Students should be able to convert a number from the binary system to the denary system.

2. Language:

Students should be able to state the value of a number in the binary system in the denary system using the following sentence pattern:

The number _____ in the binary system has the value of _____ in the denary system.

S.1 Mathematics
Numbers and Counting
The binary system
Worksheet 2

Name: _____ Class: _____ No.: _____ Date: _____

Task 1: A binary game:



Instructions:

- (i) Form groups of 4.
- (ii) Each group has a card like this one:

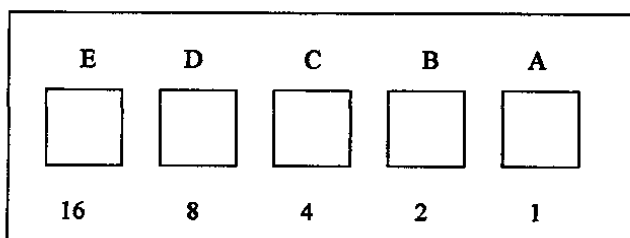


Figure 1

- (iii) Each student in the group has a score sheet like this one:

A score sheet

Number	Point
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Figure 2

- (iv) Each group also has 5 disks with number '1' written on the face, 5 disks with number '0' written on the face, and a die.
- (v) Follow these rules of the game:
 - (a) Each student throws the die 5 times during a turn.
 - (b) If the die shows an odd number, put a '0' disk in Box A on the card (in Figure 1 above). If the die shows an even number, put a '1' disk in Box A. Repeat the same procedure for boxes B, C, D and E.
 - (c) At the end of each turn, the student calculates his/her points using the following formula:
 A disk of '0' is worth 0 point. A disk of '1' is worth the number shown below the box (i.e. A: 1, B: 2, C: 4, D: 8, E: 16)

- (d) The student then fills in the *score sheet* (shown in Figure 2 above). Under the number column, write down the numbers shown in the boxes on the card (in Figure 1). For example, if the boxes show 0, 1, 1, 0, 1 from left to right, then write 1101 on the number column. Under the point column, write down the total points you have calculated in (c) above. For example, 13 ($8+4+1$) for 1101.
- (e) Each student in the group takes turns to repeat (a) to (c). The first student to get 200 points or more wins the game.

(vi) When you finish the game, discuss answers to the following questions with your group members.

Questions:

- (1) What are the characteristics of the digits in the **number column** and those in the **point column** in the score sheet?
- (2) What **number systems** do the numbers on the number column and point column belong to?
- (3) What is the relationship between the numbers in the number column and the numbers below the boxes?
- (4) What conclusion can you draw about the relationship between the numbers in the number column and the numbers in the point column? [Hint: Think about the number systems.]

Homework

Write a sentence, using the following sentence pattern, for each of the number you have got under the number column in your score sheet:

The number _____ in the binary system has the value of _____ in the denary system.