

**Subject:** Mathematics

**Topic:** Numbers and Counting

**Subtopic:** The binary system

**Level:** S.1

**Background information:**

This is the beginning of the third lesson in this topic. Students have just learnt the denary system in Lesson 2.

**Learning objectives:**

1. Content:

Students should be able to state the place value of each digit in the binary system.

2. Language:

Students should be able to state the place value of each digit in the binary system by using the following sentence pattern:

*The digit underlined is in the place value of \_\_\_\_\_. If you count from the right to the left, then*

\_\_\_\_\_ .

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

Name: \_\_\_\_\_ Class: \_\_\_\_\_ No.: \_\_\_\_\_ Date: \_\_\_\_\_

**Task 1: Magic Trick**



**Instructions:**

- (i) Look at the 6 cards below.

Card A

32	33	34	35	36	37
38	39	40	41	42	43
44	45	46	47	48	49
50	51	52	53	54	55
56	57	58	59	60	61
62	63				

Card B

16	17	18	19	20	21
22	23	24	25	26	27
28	29	30	31	48	49
50	51	52	53	54	55
56	57	58	59	60	61
62	63				

Card C

8	9	10	11	12	13
14	15	24	25	26	27
28	29	30	31	40	41
42	43	44	45	46	47
56	57	58	59	60	61
62	63				

Card D

4	5	6	7	12	13
14	15	20	21	22	23
28	29	30	31	36	37
38	39	44	45	46	47
52	53	54	55	60	61
62	63				

Card E

2	3	6	7	10	11
14	15	18	19	22	23
26	27	30	31	34	35
38	39	42	43	46	47
50	51	54	55	58	59
62	63				

Card F

1	3	5	7	9	11
13	15	17	19	21	23
25	27	29	31	33	35
37	39	41	43	45	47
49	51	53	55	57	59
61	63				

- (ii) Select a number from one of the cards. Do not tell others what the number is. When asked by the teacher, tell the class from which card you have selected the number.
- (iii) The teacher can tell you which number you have selected.
- (iv) Now, work in groups of 4 and discuss why you think the teacher knows the number.  
[Hint: Think about the place values of digits in a binary number.]

## Task 2



### Instructions:

- (i) Work in pairs.
- (ii) Student A and Student B individually work out the place value of the underlined digits in the binary numbers given.

What is the place value of each of the underlined digits in the following binary numbers?

- |                   |                    |                  |
|-------------------|--------------------|------------------|
| (a) 1 <u>1</u> 01 | (b) 100 <u>0</u> 1 | (c) <u>1</u> 100 |
| (d) 11 <u>1</u>   | (e) <u>1</u> 0101  | (f) <u>1</u> 0   |

Write your answers below:

- (a)
- (b)
- (c)
- (d)
- (e)
- (f)

- (iii) Student A and Student B then take turns to check answers to the questions by asking and answering in the following way until you agree on an answer:

A: *The answer to Question a is \_\_\_\_ because the digit underlined is in the place value of \_\_\_\_.*

B: *My answer is the same. OR My answer is different. I think the answer should be \_\_\_\_ because the digit underlined is in the place value of \_\_\_\_.* If you count from the right to the left, then \_\_\_\_\_.

A: *OK, I agree. OR I think you're wrong. It should be \_\_\_\_.* If you count from the right to the left, \_\_\_\_\_.