

# Reasoning and Problem Solving

## Step 8: Counting in Powers of 10

### National Curriculum Objectives:

Mathematics Year 5: (5N1) [Count forwards or backwards in steps of powers of 10 for any given number up to 1,000,000](#)

Mathematics Year 5: (5N5) [Interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero](#)

Mathematics Year 5: (5N6) [Solve number problems and practical problems that involve 5N1 - 5N5](#)

### Differentiation:

Questions 1, 4 and 7 (Problem Solving)

**Developing** Use digit cards to create numbers following a sequence. Sequence rule counts forwards or backwards in powers of 10 up to 1,000,000. Rule given.

**Expected** Use digit cards to create numbers following a sequence. Sequence rule counts forwards or backwards in powers of 10 up to 1,000,000. Rule not given.

**Greater Depth** Use digit cards to create numbers following a sequence. Sequence rule counts forwards or backwards in powers of 10 up to 1,000,000. Rule not given and may include negative numbers up to -1,000.

Questions 2, 5 and 8 (Problem Solving)

**Developing** Calculate the amount required to get from one given amount to another when counting backwards or forwards in powers of 10 up to 1,000,000. Rule given.

**Expected** Calculate the amount required to get from one given amount to another when counting backwards or forwards in powers of 10 up to 1,000,000. Rule not given and may include negative numbers up to -100.

**Greater Depth** Calculate the amount required to get from one given amount to another when counting backwards or forwards in powers of 10 up to 1,000,000. Rule not given and may include negative numbers up to -1000.

Questions 3, 6 and 9 (Reasoning)

**Developing** Explain who is correct when given two statements relating to a sequence. Sequence rule adds or subtracts powers of 10 up to 1,000,000.

**Expected** Explain who is correct when given two statements relating to a sequence. Sequence rule adds or subtracts powers of 10 up to 1,000,000 and may include negative numbers up to -100.

**Greater Depth** Explain who is correct when given two statements relating to a sequence. Sequence rule adds or subtracts powers of 10 up to 1,000,000 and may include negative numbers up to -1,000.

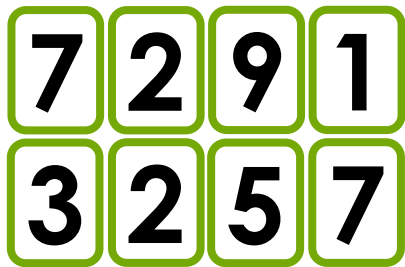
More [Year 5 Place Value](#) resources.

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## Counting in Powers of 10

1a. Here is a sequence of 3 numbers increasing by 1,000.

4,729; 5,729; 6,729



Use the digit cards to create numbers which will be in this sequence.



PS

## Counting in Powers of 10

1b. Here is a sequence of 3 numbers decreasing by 10,000.

35,670; 25,670; 15,670



Use the digit cards to create numbers which will be in this sequence.



PS

2a. The Bobble Hat Company is ordering hats for the winter.

They have 1,568 hats already in stock but have ordered 12 boxes with 1,000 in each.



How many hats will they have?



PS

2b. A magician is ordering packs of balloons.

She already has 978 balloons but orders another 15 packets of 100.



How many balloons will she have?



PS

3a. The children are discussing this sequence:

1,105; 1,205; 1,305; 1,405



Masie

Only the hundreds will change.

The hundreds and thousands will change.



Eddie

Who is correct? Explain your answer.



R

3b. The children are discussing this sequence:

1,850; 1,950; 2,050; 2,150



Benji

The number is going up in 100s.

The number is going up in 100s and 1,000s.



Chloe

Who is correct? Explain your answer.

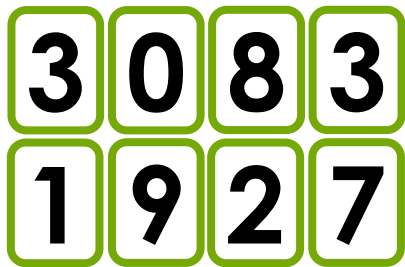


R

## Counting in Powers of 10

4a. Here is a sequence of 3 numbers.

33,890; 43,890; 53,890



Use the digit cards to create numbers which will be in this sequence.



PS

## Counting in Powers of 10

4b. Here is a sequence of 3 numbers.

70,608; 71,608; 72,608



Use the digit cards to create numbers which will be in this sequence.



PS

5a. A cinema is ordering boxes for the popcorn. Popcorn boxes are sold in packs of 10,000.



They have 456,155 boxes but need 516,155.

How many packs should they order?

If they ordered 10 packets how many boxes would they have?



PS

5b. A bank is ordering pens in boxes of 100,000.



They need 895,000 and have 50,000 already in storage.

How many boxes should they order?

If they ordered this many boxes how many extra pens would they have?



PS

6a. The children are discussing this sequence:

803,105; 703,105; 603,105



Trey

The rule is  $- 10,000$ .



Fraser

The rule is  $- 100,000$ .

Who is correct? Explain your answer.



R

6b. The children are discussing this sequence:

113,900; 113,800; 113,700



Henry

Zero will be part of this sequence.



Annie

Zero won't be part of this sequence.

Who is correct? Explain your answer.



R

## Counting in Powers of 10

## Counting in Powers of 10

7a. Here is a sequence of 3 numbers.

109,129; 108,129; 107,129



Use the digit cards to create numbers which will be in this sequence. What negative number between 0 and -1,000 would be in the sequence?



PS

7b. Here is a sequence of 3 numbers.

399,056; 299,056; 199,056



Use the digit cards to create numbers which will be in this sequence. What negative number between 0 and -1,000 would be in the sequence?



PS

8a. A sweet shop is ordering more lollipops.

They have 5,426 but need 175,526. Lollipops are sold in boxes of 10,000.



How many boxes should they order?

If they ordered 20 boxes, how many extra lollipops would they have?



PS

8b. A toy shop are ordering marbles in boxes of 100,000.

They expect to sell 453,460. They have 5,460 left from last year.



How many boxes should they order?

If they ordered this many boxes how many extra marbles would they have?



PS

9a. The children are discussing this sequence:

3,083; 2,083; 1,083; 83



The next number will be -83.

Cavis

This is the last number in the sequence.



Becky

Who is correct? Explain your answer.



R

9b. The children are discussing this sequence:

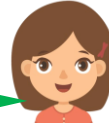
709,412; 809,412; 909,412



The sequence is increasing by  $100^2$ .

Martin

The sequence is increasing by  $1,000 \times 100$ .



Evie

Who is correct? Explain your answer.



R

## Reasoning and Problem Solving Counting in Powers of 10

### Developing

- 1a. Various answers, for example: 1,729; 2,729; 7,729; 12,729 (any numbers ending in 729)
- 2a. 13,568
- 3a. Eddie is correct. If you continued to count in hundreds, the number after 1,905 would be 2,005.

### Expected

- 4a. Various answers, for example: 13,890; 23,890; 133,890; 233,890 (any number ending in 3,890).
- 5a. 6 packs; 556,155
- 6a. Fraser is correct. The hundred thousands column is decreasing by 1 each time.

### Greater Depth

- 7a. Various answers, for example: 3,129; 7,129; 83,129; 303,129 (any number ending in 129) Negative number = - 871
- 8a. 18 boxes; 29,900
- 9a. Neither are correct. The sequence would go in to negative numbers but the next number would be - 917.

## Reasoning and Problem Solving Counting in Powers of 10

### Developing

- 1b. Various answers, for example: 5,670; 65,670; 105,670 (any number ending in 5,670)
- 2b. 2,478
- 3b. Benji is correct. In this sequence, the hundreds column is increasing by 1 each time.

### Expected

- 4b. Various answers, for example: 73,608; 75,608; 39,608; 93,608; 57; 608 (any number ending in 608).
- 5b. 9 boxes; 55,000
- 6b. Henry is correct because it is counting backwards in 100s, eventually zero will be part of the sequence.

### Greater Depth

- 7b. Various answers, for example: 899,056; 499,056; 99,056 (any number ending in 99,056) Negative number = - 944
- 8b. 5 boxes; 52,000
- 9b. Evie is correct. The sequence is increasing by 100,000 not 10,000 ( $100^2$ ).