MATHS AND MUSIC: COMPOSING WITH NUMBERS

Teachers' Notes and Answers

Learning objectives:

- To revise/become familiar with some standard number sequences
- To practise finding remainders after division (using a calculator is problematic, because it does not give remainders, so students will need to devise an appropriate method that works)
- To understand that both maths and music depend on regular patterns

Students should check their answers at the smiley faces, making sure they understand any corrections.

1. Clock arithmetic

Calculate what time the clock would show:

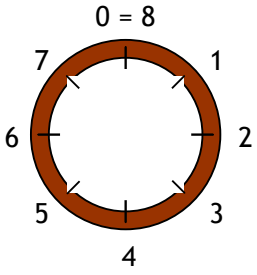
1. 10 hours later than 4 o'clock: 2
2. 25 hours later than 8 o'clock: 9
3. 45 hours later than 2 o'clock: 7

On a 12-clock:

4. 23 o'clock = 11
5. 38 o'clock= 2
6. My rule for converting numbers to the 12-clock:

- Count up in 12s, then write down the remainder
- Divide by 12 and use the remainder

2. 'Clock' arithmetic for music



In music, we have 8 notes in an octave, so we need to be able to do clock arithmetic with an 8-hour clock:

1. 7 hours later than 4 o'clock: 3
2. 14 hours later than 7 o'clock: 5
3. 45 hours later than 2 o'clock: 7

On an 8-clock:

4. 23 o'clock = 7
5. 27 o'clock = 3
6. My rule for converting numbers to the 8-clock:

- Count up in 8s, then write down the remainder
- Divide by 8 and use the remainder

3. Number sequences

For each of these number sequences, write down the next four values, and then write down the rule and/or name of each:

a. 1, 3, 5, 7, 9, 11, 13, … Rule/Name: add 2/odd numbers

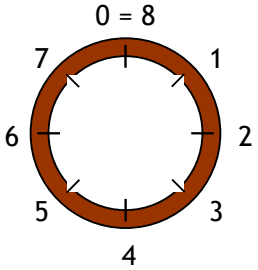
b. 2, 4, 6, 8, 10, 12, 14, … Rule/Name: add 2/even numbers

c. 1, 4, 9, 16, 25, 36, 49, 64, … Rule/Name: add next 3, 5, 7, …/square numbers

d. 1, 3, 6, 10, 15, 21, 28, 36 … Rule/Name: add 2, 3, 4, …/triangle numbers

e. 1, 1, 2, 3, 5, 8, 13, 21, 34, … Rule/Name: add two preceding numbers /Fibonacci numbers

4. Composing your tune



You could do this part of the activity in a small group if you wish.
Choose one of the number sequences above, and then fill in the table.

- You will need to work out 20 values of the sequence and put them in the **left-hand column**.
- Then fill in the equivalent number on the 8-clock (**second column**).
- Use this code to convert these numbers to musical notes (**third column**):

0 = middle C, 1 = D, 2 = E, 3 = F, 4 = G, 5 = A, 6 = B, 7 = upper C

- **Optional**: if you have time, work out a pattern for the length of the notes, to make your tune more interesting. Use the last column for this.

Number sequence	Number on the 8-clock	Musical note	Note length

Now play your tune!

If you have time, make it a bit longer, by continuing the table on a separate sheet of paper.

In the VC session after break, each group should:

- Explain which number sequence you used.
- Explain if you used a pattern for the length of the notes.
- Play your tune.
- Say what you think about your tune.