

## WS07.01 Applications of Sequences and Series

### Task 1 Investigating Compound Interest


- If each block represents €10, shade in €100.
- Then, using another colour, add 20% to the original shaded area.
- Finally, using a third colour, add 20% of the entire shaded area.
- What is the value of the second shaded area? \_\_\_\_\_
- What is the value of the third shaded area? \_\_\_\_\_
- Why do they not have the same amount? \_\_\_\_\_
- Complete the following table and investigate the patterns which appear.

Days (Time Elapsed)	Amount	Increase by %	Total decimal	Pattern/Total Amount of money received per day
0		0		100
	€120.00	20%	1.2	$100 \times 1.2$
				$100 \times 1.2 \times$

- Can you find a way of getting the value for day 10 without having to do the table to day 10?  
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\_\_\_\_\_

- Use your whiteboard to graph amount against time. Is the relationship linear?  
\_\_\_\_\_  
\_\_\_\_\_

### Task 2 Reducing Balance

David and Michael are going on the school tour this year. They are each taking out a loan of €600, which they hope to pay off over the next year. Their bank is charging a monthly interest rate of 1.5% on loans.

David says that with his part-time work at present he will be able to pay €100 for the first 4 months but will only be able to pay off €60 a month after that.

Michael says that he can only afford to pay €60 for the first 4 months and then €100 after that.

Michael reckons that they are both paying the same amount for the loan. Why?

**Note:** This problem is posed based on the following criteria:

- A loan is taken out
- after 1 month interest is added on
- the person then makes his/her monthly repayment.

This process is then repeated until the loan is fully paid off.

Time	David			Michael		
	Monthly Total	Interest	Payment	Monthly Total	Interest	Payment
0						
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						

1. What do David and Michael have in common at the beginning of the loan period?  
\_\_\_\_\_
2. Calculate the first 3 months transactions for each. (How much, in total, had they each paid back after 3 months?) David \_\_\_\_\_ Michael \_\_\_\_\_.
3. What is the total interest paid by each? David \_\_\_\_\_ Michael \_\_\_\_\_.
4. Based on your answers to the first 3 questions, when would you recommend making the higher payments and why?  
\_\_\_\_\_
5. Is Michael's assumption that they will eventually pay back the same amount valid?  
\_\_\_\_\_
6. Using your whiteboard, plot the amount of interest added each month to both David's and Michael's account.
7. Looking at the graph, who will pay the most interest overall?  
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