(A) **Lesson Objectives:**

a. Introduce arithmetic series through an investigation.
b. Introduce the formulas associated with arithmetic series.
c. Apply arithmetic series to real world scenarios.

(B) Definitions:

a. A **SERIES** simply refers to the sum of the terms of a sequence

b. Mathematically, $S_n = u_1 + u_2 + u_3 + ... + u_{n-1} + u_n$

(C) Exploring Patterns and Series

a. Let's work with PARTIAL SUMS to find some patterns and strategies for finding sums (NO CALCULATORS ALLOWED)
   i. The sum of the first 10 natural numbers is:

   ii. The sum of the first 20 natural numbers is:

   iii. The sum of the first 30 natural numbers is:

   iv. So the sum of the first 100 natural numbers is:

b. Work out the sum of the first 50 positive even integers.

c. Work out the sum of all the odd numbers from 21 up to 99.

(D) Key Ideas – Formula for Arithmetic Series

a. The formula for the sum of an arithmetic series is:

(E) Examples:

ex 1. For the series 2 + 11 + 20 + 29 + ..., find u_{20} and S_{20}

ex 2. Find the sum of the first 30 terms of the series 11 + 6 + 1 – 4 – 9 .....

ex 3. Jayne buys 10 widgets on the Jan 1st , 15 on the 1st of Feb, 20 on the 1st of March, etc..... How many widgets has she acquired in 2 years?

ex 4. Determine the sum of the series 12 + 23 + 34 + 45 + ... + 364

ex 5. A sequence is defined by the terms 2,5,8,11,14,17,.... find the sum of the series starting with the 11^{th} term and ending with the 28^{th} term.

ex 6. Shayla deposits $128 into her account. Each week she deposits $7 less than the previous week until she deposits her last deposit of $2. What total amount did she deposit?

(F) **Homework/Resources**

- **HW: from HH Textbook ➔** HH Textbook, Exercise 12G.1, p412, Q1abe as well as Exercise 12G.2, p413, Q2ad,3ac,4,6,7,10,11

- Video Help: http://www.youtube.com/watch?v=UHkueFmPC6s