**MATHEMATICS STAGE 3**

**TEACHING AND LEARNING OVERVIEW – 3 Weeks**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| TERM: | WEEK: 1and 2 | STRAND: | **SUB-STRAND:** | **WORKING MATHEMATICALLY:** |
| OUTCOMES: | | **WHOLE NUMBERS 2 - Orders, reads and writes integers of any size and describes properties of whole numbers.** | | |
| **CONTENT:** | | Identify and describe properties of prime, composite, square and triangular numbers.   * Model square and triangular numbers and record each number group in numerical and diagrammatic form. * Explain how square and triangular numbers are created * Explore square and triangular numbers using arrays, grid paper or digital technologies. * Recognise and explain the relationship between the way each pattern of numbers is created and the name of the number group | | |
| ASSESSMENT FOR LEARNING (PRE-ASSESSMENT) | | Ensure children are able to continue a variety of number patterns – numerical and shape | | |
| WARM UP / DRILL | | Buzz – Select common number patterns (e.g. odd/even numbers, counting by 2,5, 10) and a finishing number (i.e. counting up to 50) to count around the room. If a child says the wrong number they sit. When they reach the designated finishing number they must say ‘buzz’ then the person after that person is out. Increase the complexity of the number patterns each time (try doubles, +4, - 9 etc) | | |
| TENS ACTIVITYNEWMAN’S PROBLEMINVESTIGATION | |  | | |
| QUALITY TEACHING ELEMENTS | | **INTELLECTUAL QUALITY** | **QUALITY LEARNING ENVIRONMENT** | **SIGNIFICANCE** |
| * Deep knowledge * Deep understanding * Problematic knowledge * Higher-order thinking * Metalanguage * Substantive communication | * Explicit quality criteria * Engagement * High expectations * Social support * Students’ self-regulation * Student direction | * Background knowledge * Cultural knowledge * Knowledge integration * Inclusivity * Connectedness * Narrative |
| RESOURCES | | **Triangular Numbers**  **http://www.myteachingplace.com.au/index.php/resources /years5\_6\_triangular\_square\_numbers\_root\_t\_page\_1.html**  **Triangular and Square Numbers**  **http://www.myteachingplace.com.au/index.php/resources/ years5\_6\_triangular\_square\_numbers\_root\_t.html** | | |

**TEACHING AND LEARNING EXPERIENCES**

|  |  |  |
| --- | --- | --- |
| WHOLE CLASS INSTRUCTION MODELLED ACTIVITIES | GUIDED & INDEPENDENT ACTIVITIES | |
| * **Explicitly communicate lesson outcomes and work quality.** * **Investigation**   Students given grid paper in pairs and asked to colour one square. They are asked to respond to the question ‘can you colour two larger squares that contain less than 10 grid squares?’ How many grid squares are there In each of your coloured squares? (1,4,9)   * **Investigation** students shown dots   arranged in triangular pattern. Asked to explain what they notice about how pattern is growing. Record as number sentences (e.g. 1+2+3+4 = 10) to find total number of dots.   * **Teach and review** these numbers   are called square numbers. They can be represented as a square. They can be found by multiplying a number by itself.   * **Teach and review** definition for   triangular numbers.  Watch the YouTube video below and create a script to explain the formation of triangular numbers.  http://www.youtube.com/watch?v=8aZqTzH\_BD8 | LEARNING SEQUENCERemediationS2 | (No linked stage 2 content in new syllabus)  Children work with simpler repeated number patterns.  Children are assisted to complete all activities. |
| LEARNING SEQUENCES3 | * **Recording:** Students use grid paper to help complete table of square and triangular numbers. * **Grid work:** Investigate how **odd** square numbers can be shaded around the previous square on a grid, e.g.   Identify the even and odd square numbers using grid.  Create as many triangular numbers as possible on A4 size grid paper.   * **Exploring**: Use arrays to explore the relationship between square and triangular numbers (square numbers contain 2 triangular numbers) * **Challenge:** Students asked how they can use sequence of oblong (not square) numbers to create a sequence of triangular numbers. * **Investigate** further properties of square and triangular numbers, such as all square numbers have an odd number of factors, while all non-square numbers have an even number of factors; when two consecutive triangular numbers are added together the result is always a square number. |
| LEARNING SEQUENCEExtensionS4 |  |
| **EVALUATION & REFLECTION** |  |

* All assessment tasks should be written in **red** and planning should be based around developing the skills to complete that task.
* Assessment rubrics or marking scale should be considered.

**MATHEMATICS STAGE 3**

**TEACHING AND LEARNING OVERVIEW**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| TERM: | WEEK: 3and4 | STRAND: | **SUB-STRAND:** | **WORKING MATHEMATICALLY:** |
| OUTCOMES: | | **WHOLE NUMBERS 2 - Orders, reads and writes integers of any size and describes properties of whole numbers.** | | |
| **CONTENT:** | | Identify and describe properties of prime, composite, square and triangular numbers.   * Determine whether a number is prime, composite or neither * Explain whether a number is prime, composite or neither by finding the number of factors * Explain why a prime number, when modelled as an array, can have only one row | | |
| ASSESSMENT FOR LEARNING (PRE-ASSESSMENT) | | Assess whether children have an understanding of multiplication in general and ability to recall their tables.  Complete factor trees for several numbers to ensure they understand factors. | | |
| WARM UP / DRILL | | Bang bang – Children complete multiplication challenges in pairs. The first student who says ‘bang bang’ and the answer moves onto the next round. The other person is eliminated. | | |
| TENS ACTIVITYNEWMAN’S PROBLEMINVESTIGATION | |  | | |
| QUALITY TEACHING ELEMENTS | | **INTELLECTUAL QUALITY** | **QUALITY LEARNING ENVIRONMENT** | **SIGNIFICANCE** |
| * Deep knowledge * Deep understanding * Problematic knowledge * Higher-order thinking * Metalanguage * Substantive communication | * Explicit quality criteria * Engagement * High expectations * Social support * Students’ self-regulation * Student direction | * Background knowledge * Cultural knowledge * Knowledge integration * Inclusivity * Connectedness * Narrative |
| RESOURCES | | http://nrich.maths.org/828 | | |

**TEACHING AND LEARNING EXPERIENCES**

|  |  |  |
| --- | --- | --- |
| WHOLE CLASS INSTRUCTION MODELLED ACTIVITIES | GUIDED & INDEPENDENT ACTIVITIES | |
| * **Explicit Teaching**   A prime number is a whole number that only has two factors which are itself and one. A composite number has factors in addition to one and itself.  The integers 0 and 1 are neither prime nor composite.  All even numbers are divisible by two and so all even numbers greater than two are composite numbers.  All numbers that end in five are divisible by five; all numbers that end with five and are greater than five are composite numbers.   * **Investigation** Composite numbers: Some composite numbers are 4, 6, 8, 9, 10, 12 - For each of these numbers, list all of their factors: - What pattern do you notice? 23 is not a composite number. List its factors and determine why it is not a composite number. - How many distinct factors do composite numbers have? Explain what composite and prime numbers are. Give some of your own examples Discuss the number 1 and the number 2. What kind of numbers are they? | LEARNING SEQUENCERemediationS2 | Children assisted to complete factor trees using known timestables. |
| LEARNING SEQUENCES3 | **Recording**: Students find all prime numbers between 2 and 100. Answer:  2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89 and 97.  **Prime Number Challenge:**  Great Granddad is very proud of his telegram from the Queen congratulating him on his hundredth birthday and he has friends who are even older than he is. Great Granddad was born in the year A (where A is the product of 3 prime numbers), he was 20 years old in the year B (where B is the product of a prime number and a square number), he was 80 years old in the year C (where C is the product of two prime numbers) and he celebrated his 100th birthday in the year D (where D is even and the product of 4 prime numbers). When was he born? http://nrich.maths.org/828 |
| LEARNING SEQUENCEExtensionS4 |  |
| **EVALUATION & REFLECTION** |  |

* All assessment tasks should be written in **red** and planning should be based around developing the skills to complete that task.
* Assessment rubrics or marking scale should be considered.