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| **Student(s) Name(s)/ ARCOTS Code**: | | | |
| **Date :** | | | |
| **Developmental Domain** | **Progression of Numeracy**  **Strand: Number** | | |
| **Developmental Level & Nutshell Statement** | **Level I:**  Use algebraic notation to represent and solve quantitative relation between dependent and independent variable. Find rational number as a point on the number line. Calculate using rational and real numbers. Use properties of arithmetic operations to generate equivalent expressions. Compare rational numbers and find prime factors. Calculate with integer exponents. | | |
| **Evidence for this level?** (What makes you say this? | ARCOTS testing student ZPD was Level I. Analysis of work samples against the progression confirmed this. | | |
| ***What is the student ready to learn?*** | ***What are the expected outcomes and evidence?*** | ***What interventions has the teacher planned?*** | ***What worked? What next?*** |

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| **Learning Intention/s**  (Specific **skill** or concept or part thereof to be learned) | **Evidence** (What the students will be able to do, say, make or write): | **Teaching Strategy** (What the *teacher* says, does, makes or writes) | **Learning Activity**  (Describes what the students are actually going to do) | **Resources** (People, place or things used in the activity to realise the learning strategy) | **Review & Reflection** |
| Students will be able to use exponent laws to multiply and divide exponential expressions, including numbers raised to the power of zero. | - Students describe numbers written in exponential (index) notation using terms such as 'base', 'power', 'index' and 'exponent'.  - Students use exponent (index) laws to multiply and divide exponential expressions, including numbers raised to the power of zero.  - Students identify everyday situations where exponential numbers are used. | ***JUNIOR YEARS***  ***Expositive***  • Teacher will:   * Explain expansion of index numbers into the usual number form. * Provide rationale for index laws (includes definition with explanation of value of any number to the power of 0).   ***Associative/Investigative***  • Teacher will:   * Ask students to work in pairs to investigate examples of the use of index numbers in real life situations. * Provide students the opportunity to analyse real life cases of repeated multiplication of the same factor. | ***JUNIOR YEARS***  • Students will research two numbers that are ‘usually’ presented as exponent (index) numbers in real life situations, with their background usage.  (if hints required – small and large measurements in space travel, atomic structure etc.).  • Students will explore the meaning of powers by analysing real life examples of repeated multiplication of the same factor. Then they will apply index laws to divide and multiple this exponential expressions. | • Worksheet with some real life examples of repeated multiplication of the same factor (e.g. Biology: calculation of the population size when simple amoeba divide in half;  Interest calculations at a fixed interest rate; Tracing the family history, for each generation it is doubling the number of people from the previous generation, etc.).  • Teachers can access to Ultranet eBookbox ‘Working with Numbers’ where different interactive activities are available to work through this learning intention: Index lawsExploring the laws of exponentsSimple examples of index lawsPowers review | **Review Date:**  **Reflection:** |
| ***MIDDLE and UPPER YEARS***  ***Expositive***  • Teacher will:   * Explain expansion of index numbers into the usual number form. * Provide rationale for index laws (includes definition with explanation of value of any number to the power of 0).   ***Associative/Investigative***  • Teacher will provide students the opportunity to expand different index numbers and then investigate how index can be divided and multiplied.  • Teacher will ask students to investigate, in groups, why the exponential notation is needed and how exponential notation makes calculation more efficient. | ***MIDDLE and UPPER YEARS***  • Students will expand a range of index numbers  (ex: 22 = 2 x 2, 23 =2 x 2 x2, etc.)  • In groups students will analyse what is the simplest way to write the answer for divisions and multiplications involving index, such as 22 x 23; 33 x 34, etc.  • Students need then to identify the index laws that can be applied for the division and multiplication of exponential expressions. | **Review Date:**  **Reflection:** |
| **Rationale:** | Differentiated context, the activities proposed on the first line can be more suitable for junior years’ students. In turn, the activities on the second line can be more suitable for middle and upper years’ students.  The PLT Log references an eBook box (‘Working with Numbers ‘) which is available on the Ultranet as Design Space 66512121. The activities in the eBook box should be allocated to students according to the teacher’s knowledge. | | | | |

Was the teaching intervention successful?

If yes, what, if anything would the PLT do differently? If no, why not?