Patterns and Algebra
Year 7 TERM 4

Australian Curriculum:

ACMNA175: Introduce the concept of variables as a way of representing numbers using letters.
ACMNA176: Create algebraic expressions and evaluate them by substituting a given value for each variable.
ACMNA177: Extend and apply the laws and properties of arithmetic to algebraic terms and expressions.
ACMNA179: Solve simple linear equations.

KEY UNDERSTANDINGS:

- A pattern is predictable, has a sequence, is repetitive and can be defined.
- Patterns can be represented in a variety of ways e.g. Pictures, diagrams, graphs, expressions, concrete materials.
- Symbols can be used to represent numbers.
- Arithmetic laws and order of operations apply to expressions involving pro numerals
- Relationships in patterns can be represented symbolically.
- Symbolic representations are a way of communicating mathematical ideas in a concise and consistent form.
- Expressions can be used to represent real world problem situations

RESOURCES:

- Maths 300 (user name: XXX, password: XXX)
- http://www.maths300.esa.edu.au/
- MAB (Multi Attribute Blocks)
- Unifix blocks
- Match sticks
- Counters
- Paddle pop sticks
- Triangle and square dot paper
- Square Tiles
- Working like a mathematician Poster/handout
- Student worksheets
- Staff share drive.

LANGUAGE:

- Represent
- Pro numeral
- Variable
- Symbols
- Algebra
- Algebraic
- Patterns
- Equation
- Value
- Generalisation
- Substitution
- Brackets
- Order of operations
- Formula
- Terms

<table>
<tr><th colspan="4">Proficiency strands:</th></tr>
<tr><th>Fluency</th><th>Understanding</th><th>Problem Solving</th><th>Reasoning</th></tr>
<tr>
<td>Uses efficient counting techniques.
Uses authentic formulas to perform substitutions.
Solve simple linear equations.</td>
<td>Arithmetic laws and order of operations apply to expressions involving pro numerals
Symbolic representations are a way of communicating mathematical ideas in a concise and consistent form.
Expressions can be used to represent real world problem situations</td>
<td>Explore the problem using a variety of resources and strategies.
Uses the most appropriate and efficient strategy to solve the problem.
Record thinking in ways that make sense to individual students.
Apply skills and strategies to an unfamiliar context.</td>
<td>Identify patterns
Identify and describe patterns
Represent patterns in a variety of ways (concrete, diagrammatic, tabular and symbolic)
Use mathematical symbology to express relationships</td>
</tr>
<tr><th>INVESTIGATIONS:</th><th>TEACHER FOCUS
(Modelling)</th><th colspan="2">QUESTIONS:</th></tr>
<tr>
<td>1. Match Triangles</td>
<td rowspan="4">Order of operations
Using efficient counting techniques.
Problem solving strategies, eg. Tables, graphs.
Model ways of recording thinking. (including ICT)
Substitution to solve equations
Model mathematical language within context.</td>
<td colspan="2" rowspan="4">Can you find a pattern?
How many different ways can you describe your pattern?
Can you put a rule to your pattern?
How can you check your rule?
How do you know you have the right answer?
What would happen if...?</td>
</tr>
<tr><td>2. Unseen Triangles</td></tr>
<tr><td>3. Sphinx</td></tr>
<tr><td>4. Tiles: 4 Arm Shapes Garden Beds</td></tr>
<tr>
<td colspan="2"><u>Links to Maths 300</u>
Match Triangles: Lesson 164
Unseen Triangles: Lesson 20
Sphinx: Lesson 25
4 Arm Shapes: Lesson 40</td>
<td colspan="2"><u>Links to Task Cameos (Mathematics Centre)</u>
Match Triangles: Task 178
Unseen Triangles: Not yet available but similar to 178
Sphinx: Task 166
4 Arm Shapes: Task 154</td>
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ASSESSMENT:

Evidence of student achievement may include:

- Portfolio of student's recordings on each of the investigations participated in.
- Analyse students individual recording
- Observations of students mathematical skills (anecdotal records. Interviews with students)
- Maths Journal
- Quiz