Dance planner	**Level 3**	**Topic/Theme:** Shape, number, pattern	**Duration**: 10 x 30–40 minute lessons	**Class:** Yr 5–6, L 3

PK – **Developing Practical Knowledge in Dance**
Students will explore through movement, combine and contrast the dance elements of body awareness, space, time, energy, and relationships.

DI – **Developing Ideas in Dance**
Students will select, combine, and use elements of dance to develop ideas.

CI – **Communicating and Interpreting in Dance**
Students will present dance and respond to their own and others' dance works within their school communities.

UC – Understanding Dance in Context
Students will explore and describe how dance is used for different purposes in a variety of cultures.

Specific Learning Outcomes Students will be able to:

- Explore mathematical shapes, numbers, and patterns by combining and contrasting stillness, locomotor, and non-locomotor movement. (PK)
- Create and link with smooth transitions a mathematical group dance by selecting, matching, and contrasting four activities. (DI)
- Perform mathematical group dance as rehearsed. (CI)
- Demonstrate appropriate audience skills by responding and identifying at least two of the mathematical activities. (CI)
- Investigate, view and discuss the use and/or purpose of mathematics in a variety of dance styles and forms. (UC)

Strand	Assessed
PK	*
DI	*
CI	*
CI	
UC	

Teaching and learning focus

Body awareness
Locomotor
Non-locomotor
Body Parts
Body Base
Body Shapes

Relationships
Individual
Pair
Group
To objects
To environments

Space
Level
Pathways
Direction
Size/ Range
Focus
Place

Time
Tempo Beat/Rhythm Accent

Energy
Weight Flow Energy Dynamics

Resources and equipment

- Hall space
- CD player, drum
- CDs: Use a variety of music, such as *Groove Armada: Vertigo*, *Massive Attack*, *Te Vaka*, Classical: music by Vivaldi, Mozart, etc.)
- Dance word cards and number (digit) cards
- Maths 3-D blocks, tessellation patterns

Cross-curricula links

- Language
- Maths

Essential skills

- Communication
- Numeracy
- Information
- Problem solving
- Self management and competitive
- Social and co-operative
- Physical

Rationale

Shape, number, pattern unit:
Exploring mathematical concepts through dance (Level 2)

Dance can significantly enhance, deepen and increase learning in all of the other essential learning areas, and especially mathematics. This unit extends the students' mathematical investigations through the kinaesthetic activities in dance.

Crossover between maths and dance

Dance is geometry – shape-making, symmetry, asymmetry, reflections, rotations, transformations and directions. Dance uses algebra patterning, group formations, tessellations, repetition, sequences, and variations. Dance uses numeracy and the counting of beats, accents, syncopated time patterns, and other rhythm and time structures. Dance uses mapping, the clock, compass, and other shapes and spatial formations. Dancers and choreographers need to calculate and measure spatial dimensions and the proportions of floor and air space when choreographing and staging a production.

Dance explores and creates patterns, pathways and group formations on the floor and in the air. Dance uses and investigates relationships in time and space with other dancers, with objects (chairs, cushions) and props (elastics, ti rakau, poi), and with the shapes and patterns of the natural environment.

Teaching and learning sequence

For each dance lesson, select and teach one activity from the following list. Relate each activity to the teaching of the appropriate mathematical strand(s): mathematical processes, number, measurement, geometry, algebra, and statistics. During the unit, continue to revisit activities (suitable to year level) to foster recall skills. Group work and/or a whole class dance can be initiated, developed, and refined throughout the duration of this unit (a 10-week term).

Activities

Developing Practical Knowledge in Dance (strand PK): Exploring, identifying, combining, and contrasting the dance elements of body awareness, space, relationships, time, and energy. (Level 3)

Activity 1: Tessellating patterns
Investigate shape sequences and repeating patterns with the whole class using their bodies to tessellate (that is, make a pattern of congruent shapes, such as triangles, squares, or hexagons, to cover the floor surface). Students describe the rule, and draw and notate their tessellation sequence dance.
Related mathematics – see Algebra Level 3 Achievement Objective: Students will be able to make up and use a rule to create a sequential pattern. *Mathematics in the New Zealand Curriculum,* Pages 138–141.

- Use the human form to make tessellating triangles in a range of levels (that is, at low horizontal level, medium level, and at high vertical level), instead of using the more usual objects like matches or pencils. Make the shape of a triangle on a low horizontal level with three bodies. Tessellate by introducing two more bodies to make a second triangle connected to the first triangle. Repeat the tessellating sequence by introducing two more bodies to make a third triangle. Repeat to make a fourth triangle.
- Count the number of triangles and the number of bodies. Describe a rule for finding the next number of the sequence. Draw the triangle body tessellation.
- Repeat the tessellating spatial sequential patterning using squares, hexagons, and octagons. For example, use the whole human form to represent one side of a square (that is, four bodies are needed to make the shape). Then three bodies are needed to tessellate the square out in any direction. Use two bodies to make a square or diamond, by bending the human form at the waist, lying sideways and horizontal to the floor to represent half of a square. One body and a 'half' are then needed to tessellate the square or diamond.

Activity 2: Directions

- Group formation 'Flocking': Travel locomotor together in a series of different directions following a leader, moving as a close-knit group of three (triangle shape) or four (diamond shape). Leaders change when the leader of the triangle or diamond makes a rotational turn left or right to face another member of the flock. (Start flocking non-locomotor – sitting, kneeling and standing – before travelling).
- Group formations can focus on a dance about distance (that is, positioning nearer and further away). Large or small groups can follow a sequence of movements in close proximity to each other, or distance themselves from each other by using different directions and mathematical concepts.

- Explore the dance elements of time and energy by moving at varying speeds (faster or slower), and varying dynamics (explosive and erratic or smooth and sustained) in a series of different directions.
- For other activities about directions, see the Level 2 'Shape, number, pattern' unit.

Activity 3: 3-D shapes

Explore making non-locomotor 3-D (three-dimensional) shapes with the whole body individually and then in pairs (such as cube, oblong, prism, sphere, cylinder). Repeat, using isolated parts of the body to make a 3-D shape (such as fingers to make a cylinder shape).

- Create 3-D frozen (still) shapes by stretching up and down through different levels in pairs or groups. Practice concentrating and controlling the body's muscles to stay frozen, and the ability to start and stop suddenly, while keeping balance.
- In groups of 6–8 students, use large elastics create 3-D shapes. The dancers with the elastic prop create still shapes and non-locomotor movement, while the dancers without the elastic locomotor in and out of the changing 3-D elasticised shapes making their own 2-D and 3-D shapes.
- For other activities about shapes, see the Level 2 'Shape, number, pattern' unit.

Activity 4: Symmetry and asymmetry

- Explore symmetrical shapes with the whole body on different levels (that is, low, medium, and high levels).
- Explore symmetry in pairs. Make one geometric shape between the pair, then create another.
- Individually or in pairs, students make a pattern-sequence of geometric shapes, which has either rotational or reflective symmetry.
- Explore creating asymmetrical shapes with the whole body. Repeat using isolated body parts (such as fingers, then legs).
- A dance phrase can be created by making a still symmetrical shape, which is then tilted to one side to make an asymmetrical shape, and then tilted again into a locomotor movement. Repeat by making another symmetrical shape on a different level, tilting out into an asymmetrical shape.

Activity 5: Repeating shape patterns

- In groups of 6–8 students, create a non-locomotor (stationary) pattern of shapes. Explore a variety of group positions and formations. For example, line up one after the other and move one at a time to make a shape following the person in front, or line up across the width of the space all facing to the front or all to the back or in alternating positions making individual shapes, but in a specified order.
- Create a linked locomotor (travelling) pattern of shapes. Explore moving together as a group. For example, make one large group shape (such as a circle), then all make another group shape (such as a triangle), then make another shape (such as a rectangle). Repeat the series of shapes, moving smoothly from one shape to another without discussion.
- Explore travelling, following, and copying a shape one at a time, using in the (Level 4) choreographic device of canon (that is, all make the exact same movement but next person starts a set time after the person before so that the movements overlap, such as in a Mexican wave). The sequence of overlapping shapes may link with other movement in between each shape and use a variety of different directions (such as upwards, downwards, sideways, backwards, forwards, inwards, outwards) across the floor space.
- Explore the dance element of time by repeating the pattern of shapes fast or slow, then increasing from slow to fast, then decreasing from fast to slow.

Activity 6: Stretching digits (expanded numerals)

- Students form groups of three. Teacher calls out three digits (such as 2, 6, and 3) and the three

students in each group quickly choose one of these digits (for example, Child A chooses '6', child B chooses '2', child C chooses '3'). The 3-digit number is then displayed on a card as an expanded numeral (for example, 362 = 300 + 60 + 2). Then teacher calls "Stretch out this number: 362". The object of the game is for each group of students to position their bodies into the three-digits and then quickly stretch out into a still frozen shape representing the expanded numeral '300 + 60 + 2'.

- The fastest team gains points. Examples of other expanded numerals to use include '748 = 700 + 40 + 8', '999 = 900 + 90 + 9', and '507 = 500 + 0 + 7'.
- Repeat in groups of four, with four-digit numbers displayed on cards (for example, 5296 = 5000 + 200 + 90 + 6).
- Repeat in groups of three and then four, displaying how small or big each digit is by using low, medium, and high levels when making frozen shapes. For example, for the number 195, the digit '5' in the ones column is shown as a low thin shape, the digit '9' in the tens column is shown as a medium-level slightly expanded shape, and the digit '1' in the hundreds column appears as a high expanded shape. Discuss with students how the still shape could connect, link, or overlap using their bodies like the three-digit number and showing it's linking and overlapping of the ones, tens and hundreds columns.

Mathematical dance

Developing Ideas in Dance (strand DI): Students will select, combine, and use elements of dance to develop ideas. (Level 3)

- In groups of either 3–5 or 6–8 students, select four of the mathematical dance activities (see above) to create a mathematical dance focusing on matching and contrasting movements. Use a variety of non-locomotor and locomotor movements and still shapes, and create a definite group start and finish (that is, a frozen moment or still shape).
- **Extension activities:** Use the choreographic devices of canon, repetition, and retrograde. (See Ministry of Education 'Dance Wall Chart 2, Set 2: Developing Ideas in Dance').
- With help from the teacher, the class choreograph a dance that celebrates mathematics. Using the above activities (1–6), groups can enter and exit, match and contrast, and thus connect and extend a range of movement sequences.

Communicating and Interpreting in Dance (strand CI): Students will present dance and respond to their own and others' dance works within their school communities. (Level 3)

- Each group communicates by performing, and sharing about, their 'Mathematical dance' to the rest of the class.
- The audience interprets the other groups' mathematical dances through sharing and discussion.

Understanding Dance in Context (strand UC): Students will explore and describe how dance is used for different purposes in a variety of cultures. (Level 3)

- Identify and investigate dances in the community that use mathematical shapes and patterns (such as circle and line dances).
- View a dance performance and discuss the mathematics involved in the movements, groupings, and formations, and how they are used to convey meaning and purpose.

Extension activities: For more mathematical dance activities, see the 'Shape, Number, Pattern' Level 2 unit.