



KŌWHITI WHAKAPAE: MATHS

Lay the groundwork practice cards

Kōwhiti Whakapae is an online curriculum resource designed to help early learning kaiako strengthen planning, formative assessment and teaching practice within the framework of *Te Whāriki: He whāriki mātauranga mō ngā mokopuna o Aotearoa* (2017).

The maths lay the groundwork practices in this set will help you to whakaritea te pārekereke – prepare the seedbed and create an enabling environment for all children.

Each card shows information about what the practice is, why the practice is important and how you might apply it in your setting. Please note that the list of practices is not exhaustive, and you might think of other practices appropriate for your setting.

- › Consider your current environment and how you could make it better.
- › Talk to others about what you are already doing.
- › Select practices that will be meaningful in your setting.

*Before engaging with the Kōwhiri Whakapae maths lay the groundwork practice cards, we encourage you to visit Kōwhiri Whakapae, particularly the '**About**' tab. Here you will find helpful information, including more about what **Kōwhiri Whakapae** is, why it was developed and connections to **Te Whāriki**.*

[https://
kowhiri-
whakapae.
education.
govt.nz/](https://kowhiri-whakapae.education.govt.nz/)





Tūhuratia te Pāngarau

Create & Communicate Maths

As children construct, model, draw, or create symbols they are involved in processes that represent maths thinking.

**Lay the
groundwork**

**Practices to whakaritea te pārekereke -
prepare the seedbed for all children.**

Start by working with all the children in your setting. Create an environment that can support children to build skills related to Create & Communicate Maths.

- › Consider your current environment and how you could make it better.
- › Talk to others about what you are already doing.
- › Select practices that will be meaningful in your setting.

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Create & Communicate Maths

Lay the groundwork practices

Supporting maths exploration and investigation

Create an environment that supports curiosity, exploration and investigation related to maths.

Why is this practice important?

An environment that encourages children's curiosity, exploration and investigation of maths, supports children to develop their maths working theories and ways of understanding the world. Children's exploration with maths might lead them to solutions, such as a construction or completed pattern or generate further pathways to explore. For some children, the predictability and consistency of concepts such as number, shape, and pattern is reassuring and brings them a sense of security and meaning.

How to apply this practice in your setting:

- › Work with whānau to learn about children's experiences of maths at home or in the community. Create an enabling environment in your early learning setting that connects with these experiences.

- › Create provocations that encourage children to pose problems and generate and refine working theories, such as displaying unfinished weaving that invites children to continue, change or complete the pattern. To provoke curiosity, provide images of tall or patterned buildings near the block area, or display lavalava/pareu/sarong to create interest in the art of stencil painting.
 - › Support children to pose their own spoken or non-spoken questions, e.g. a child's actions may provide clues about their wonderings. Demonstrate ways to pose questions, including through commentary, or by asking "I wonder if ...?", "I'm puzzled about ...", "What do you think?" ("He aha ōu whakairo?")
 - › Use specific maths language and gesture where appropriate, e.g. the order of a pōwhiri – the number of people who do the karanga (call), the number of people who do the whaikōrero (speeches), the different sizes of carvings and tukutuku panels.
 - › Create contexts that enable individuals or groups to extend explorations or investigations for sustained periods, e.g. make 'work in progress' signs to protect children's work, or organise kai outdoors instead of dismantling ongoing work.
 - › Share with whānau the ways that you support children to be curious about and use maths to explore and investigate their ideas.
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Create & Communicate Maths

Lay the groundwork practices

Resources to model or represent maths thinking

Provide resources that support mokopuna to model or represent their maths interests and thinking through creative play.

Why is this practice important?

As children play and investigate their world, they use resources to create models or representations of their ideas, including their maths ideas. Children's maths thinking is illustrated through a process of modelling and the models they create, e.g. when children rearrange furniture to construct a whare, their planning and construction process (modelling) and the final whare (model) shows spatial thinking and problem solving.

How to apply this practice in your setting:

- › Take time to learn from whānau the kinds of creative play that mokopuna enjoy. Provide resources that support children to model or represent their maths thinking through these.

- › When creating models or representations, support children to explore the properties of different materials. Together reflect on their usefulness, and choices, e.g. comment on the properties of wood a child has chosen to hammer a nail into, “It’s very hard and thick”, or the features of a feather in a heuristic play basket.
 - › Support mokopuna to adapt resources to suit their play purposes, e.g. cutting out, folding, pulling apart, joining. Use scaffolding to support children’s thinking, e.g. fold a blanket in half and invite a child to do the next fold.
 - › Introduce materials that provoke mokopuna to expand their exploration, e.g. adding feathers beside water play to explore properties of weight.
 - › Notice when mokopuna prefer one specific material and encourage them to expand the inventive ways that they can use that single resource, e.g. using cardboard cylinders to build a track for their cars to go through, or to build a tower.
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Create & Communicate Maths

Lay the groundwork practices

Modes to support maths play and investigations

Provide opportunities for mokopuna to represent their interests, play and investigations in a variety of modes.

Why is this practice important?

When mokopuna are supported to express and model maths thinking using different modes, e.g. symbols, gesture, language, movement, music, drawing, and role playing, they share maths thinking in ways that suit their interests. Using a range of modes to create models or representations, allows children options to practice purposeful maths thinking. Maths thinking includes testing properties and making decisions about how or what resources to use, adapt materials or switch modes for a purpose.

How to apply this practice in your setting:

- › Work with whānau to learn about the different ways (or modes) that mokopuna enjoy using to explore and express themselves at home and in their community, e.g. through art (mahi toi), movement (korikori), language (reo), music (puoro), dramatic play (ngā whakaari ā-whānau).

- › Provide a variety of resources that mokopuna can use to explore, represent or model their maths thinking in different modes, including those enjoyed in their home contexts, e.g. musical instruments, art or construction materials.
 - › Provide sustained opportunities for mokopuna to create another representation of their construction or model in different modes, e.g. making drawings of their block construction or pattern, inventing symbols to illustrate a garden design, or a mud pie to represent a birthday cake.
 - › Draw attention to the ways kaiako use different modes to represent their maths thinking, e.g. birthday charts, recording moe (sleep) times, or ringing a bell to represent daily patterns such as kai time.
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Create & Communicate Maths

Lay the groundwork practices

Using maths language

Create opportunities for children to use language to express their thinking during maths related experiences.

Why is this practice important?

When children have many opportunities to describe and clarify their thinking with others, then they can consolidate and expand understanding of their own thinking. This supports them to become more proficient at using language to communicate their maths thinking. The way children communicate their maths thinking provides a window into their ideas and working theories. This creates an opportunity for kaiako to support and scaffold learning and connect to further learning possibilities.

How to apply this practice in your setting:

- › Make use of planned and spontaneous opportunities for mokopuna to communicate their thinking using spoken and non-spoken language, e.g. support pairs or small groups of children to share and discuss their ideas through art or conversation.

- › Pose open-ended questions as prompts for mokopuna to express their thinking in different ways, or to elaborate or expand their ideas.
 - › Support mokopuna to think out loud and to ask questions during maths exploration, e.g. provide running commentary about your own actions “I want this to go there. I’ll push it sideways. I need to turn it. Yes!”
 - › Foster language of curiosity, puzzling, problem posing and prediction in a variety of modes, e.g. speaking, gesture, movement, artwork. For instance, wonder how something could be built differently or made stronger using alternative materials.
 - › Notice and encourage the language of creativity, agency, dispositions and working theories, e.g. “I noticed you were trying new and different ways to put those smaller blocks together and you kept trying until you found what you wanted”.
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Te Tau me te Whakaine

Number & Measurement

At an exploratory level children begin using the number system to help arrange, count objects and compare quantities for a purpose.

Lay the groundwork

**Practices to whakaritea te pārekereke -
prepare the seedbed for all children.**

Start by working with all the children in your setting. Create an environment that can support children to build skills related to Number & Measurement.

- › Consider your current environment and how you could make it better.
- › Talk to others about what you are already doing.
- › Select practices that will be meaningful in your setting.



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Number & Measurement

Lay the groundwork practices

Number awareness and enjoyment

Foster an awareness and enjoyment of number including measurement and its uses.

Why is this practice important?

Experiencing number as a concept supports children to use numbers to express and compare quantity, and enjoy using number patterns, e.g. counting. As children explore and recognise structure and regularity of the number system, they become confident to use numbers and counting to participate in number and quantity experiences in the wider world. Interest in the variation of number, supports children to understand number is expressed and used differently across countries, cultures and generations.

How to apply this practice in your setting:

- › Take time to engage with whānau and learn about children's experiences of number and measurement at home or in the community. Reflect these experiences in your setting where possible.

- › Be attuned and responsive to the ways children express their interest in number or counting, e.g. with gesture, language, imitation of movements, or rhythm. Share what you notice with whānau and your team.
 - › Identify and build on number-related experiences in the setting, such as: action songs, books, sand, and water play; counting as part of everyday tasks like preparing paints (“How many jars?”), and cooking and measuring ingredients.
 - › Plan ways to incorporate number and number patterns within waiata, chants, sāsā, haka, dance, and movement, e.g. counting the beat, clapping rhythms or counting-in ‘tahi, rua, toru, whā’ to start waiata.
 - › As a team, discuss ways to intentionally communicate about number and quantity with children, e.g. think aloud – “One for everyone”, “Walking in twos”, “Bigger”, “Smaller”, “Heavier”, “First”, “Second”.
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Number & Measurement

Lay the groundwork practices

Exploring number through children's interests

Support mokopuna to use number to explore their interests or for specific purposes.

Why is this practice important?

When mokopuna are curious and creative with number and measurement through their interests, they are more likely to find using number exciting and fun. Mokopuna bring knowledge about number from their whānau and community, which supports their participation in social and cultural number-related experiences connected with their daily life. By participating in a range of number activities for a purpose, mokopuna learn social and cultural practices, e.g. counting, grouping or measuring.

How to apply this practice in your setting:

- › Connect with whānau and others in your team to understand children's interests that have potential to involve number and quantity. Brainstorm as a team how you can use this understanding to support children to

expand their exploration and knowledge through these interests.

- › Provide number-related materials to help children expand their exploration and knowledge of number and quantifying, such as: shells and nested containers for grouping, counting, or measuring; blocks for combining and dividing; and informal measures such as string and formal measures such as rulers for measuring.
 - › Pose questions and wonderings to help children use number or measurement when developing working theories, e.g. “I wonder which plant had the bigger seed?”
 - › Identify purposeful activities that have the potential to involve number and quantifying. Invite children to participate in or lead these activities, e.g. counting the number of people on an excursion, checking the level in an outdoor water tank, measuring ingredients for paints, setting places at the kai table.
 - › When appropriate, model how numbers can be organised (structured) in different ways using materials related to children’s play interests, e.g. group objects in pairs or place them in matching lines. Draw attention to these ‘structures’, e.g. “Oh, the buckets and spades are in pairs”.
 - › Use number-related language in relation to children’s interests or purpose, e.g. “If we quarter the orange, then the four of you can have a piece each”. “Do you think we need fewer steps in this dance to make it easier to remember?”
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Number & Measurement

Lay the groundwork practices

Exploring and using number together

Support mokopuna to collaborate when exploring and using number.

Why is this practice important?

When mokopuna work together to use number and measurement to explore their interests and solve problems they are also working together to make sense of the wider world. Collaborating also engages mokopuna in thinking critically as they predict, test ideas and develop working theories. Posing questions related to number, e.g: How many – e hia? (quantifying); Which has more? (comparing); Which is bigger – he aha te mea nui? (measuring), encourages mokopuna to use number in purposeful ways.

How to apply this practice in your setting:

- › Provide a wide range of materials and sufficient space and time to support collaboration when exploring number, counting and measuring, e.g. collections of the same resources, a variety of materials for measuring (such as string, rulers), and enough space for sustained exploration.

- › Suggest and model ways for children to invite others to join them in exploring and solving number-related problems, e.g. “You could ask Hana to hold the end of a tape measure”.
 - › Encourage mokopuna to describe or explain their thinking about the number related aspects of their play using a variety of modes, e.g. speaking, sign language, alternative and augmentative communication (AAC), gesture and movement, artwork.
 - › Highlight number patterns within shared experiences, e.g. help mokopuna organise themselves into pairs for excursions, giving two poi to each person, or clapping to identify beats in a dance.
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Te taura me te pānga

Pattern & Relationships

In art, construction, routines, and playful experiences children notice, create and use the regular structure of pattern to foster prediction.

Lay the groundwork

Practices to whakaritea te pārekereke - prepare the seedbed for all children.

Start by working with all the children in your setting. Create an environment that can support children to build skills related to Pattern & Relationships.

- › Consider your current environment and how you could make it better.
- › Talk to others about what you are already doing.
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Pattern & Relationships

Lay the groundwork practices

Patterns in the wider world

Support children to recognise, enjoy and respond to patterns in their wider world.

Why is this practice important?

Drawing children's attention to the variety of patterns in the environment stimulates their awareness and interest in patterns. Patterns involve repetition and might be physical, social or related to time. An awareness and interest in the mathematical features of patterns such as repeated elements and regular structures, helps children enjoy and respond to patterns in daily routines, art and music etc. and to use patterns to investigate and understand the wider world.

How to apply this practice in your setting:

- › Take time to understand from children what they already know about pattern. Engage with whānau to learn about children's experiences of pattern at home or in the community, including cultural patterns and their meaning.
- › Learn about the cultural significance of a pattern or object, before exploring the maths features, e.g. explore the

significance of kōwhaiwhai, tapa patterns before looking at the symmetry of the shapes with children.

- › Reflect children's cultural patterns in the settings resources and regular events, e.g. beat and rhythm using rākau sticks, or patterns in Celtic art.
 - › Provide experiences that illustrate pattern regularity, repetition and structure in different modes, e.g. visual patterns in natural materials, art, puzzles and clothing; sound patterns in waiata, drumming, clapping and chants; or movement patterns in dance, daily routines and action songs.
 - › Share with whānau the ways that children experience pattern within the setting.
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Pattern & Relationships

Lay the groundwork practices

Adapting and creating patterns

Support mokopuna to use and adapt familiar patterns and to create new patterns.

Why is this practice important?

When mokopuna notice each part of a pattern and how these parts fit together, e.g. the same feature might increase in size or be in a different position, then they are able to adapt familiar patterns and create new patterns. Using, adapting, and creating patterns helps mokopuna to use maths to investigate, problem solve and make sense of their world. Adapting and creating patterns can also support mokopuna to understand and adapt patterns in their everyday life.

How to apply this practice in your setting:

- › Encourage children to experiment with a range of resources for patternmaking, e.g. uku (clay), harakeke, kitchen play equipment, tiles, collage materials, geometric puzzles, and blocks.
- › Model ways to recognise and adapt repeating elements in patterns for a purpose. Use the language of sameness and

difference to focus on repeated elements, e.g. 'black, red, white, black, red, white', spirals sequenced from small to large.

- › Encourage children to be curious about and creative with patterns, e.g. ask 'I wonder...' questions to encourage children to predict, continue, extend or correct a repeating element in a pattern.
 - › Support individual or shared patterning experiences over time, that might include large or continuous patterns and reflect a range of designs that respond to children's identity, language and culture.
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Pattern & Relationships

Lay the groundwork practices

Exploring relationships within patterns

Create opportunities for children to explore relationships within patterns.

Why is this practice important?

When children recognise how features of a pattern relate to each other, e.g. repeating shapes, colours, sounds, movements, then they are better able to predict, select, make or adapt the next part of a pattern. These skills help children to use and create patterns to investigate their world and to problem solve.

How to apply this practice in your setting:

- › Provide opportunities for children to experience multiple modes of patterns, e.g. music, shape, colour, dance, and relationships among these, e.g. actions that correspond to the beat of a waiata.
- › Encourage children to think about specific features of familiar patterns and the relationships between these features, e.g. washing hands, then saying karakia kai before eating.

- › Model being playful with patterns, e.g. when grouping or sequencing objects according to size or colour, suggest regrouping according to an unexpected feature, e.g. texture.
 - › Using a range of patterns, constructed with different materials or represented in different ways, foster working theories about sameness and difference.
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Te Mokowā me te Whakaine

Space & Measurement

Through a range of experiences children learn concepts and language related to shape, size, location, distance, and spatial visualisation.

Lay the groundwork

**Practices to whakaritea te pārekereke -
prepare the seedbed for all children.**

Start by working with all the children in your setting. Create an environment that can support children to build skills related to Space & Measurement.

- › Consider your current environment and how you could make it better.
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Space & Measurement

Lay the groundwork practices

Exploring movement and location

Plan opportunities and challenges for mokopuna to experience, explore and understand movement and location in their environment.

Why is this practice important?

When mokopuna experience and make sense of the spatial world around them, they then learn how people, places and things are spatially related. Mokopuna will do this at their own pace and in their own way. Mokopuna bring knowledge and experiences of space, movement and location from their home, whānau and community contexts. They explore and make meaning when moving and positioning themselves within spaces, as well as exploring measurement through distance, and two- and three-dimensional spaces.

How to apply this practice in your setting:

- › Connect with children to learn what they already know about movement and location and engage with whānau on

children's experiences of these concepts at home, or in the community. Respect the cultural knowledge they bring.

- › Share with whānau the ways that children experience movement and location within the setting, e.g. how they navigate indoor and outdoor spaces, large, small, open, enclosed, and how they use or create 'pathways' between.
 - › Identify spaces in your setting that allow for playful exploration with movement or observation of location. How do children explore under, around, through these spaces? Do children create real or imagined pathways or circuits and how do you as a team support this exploration?
 - › Identify and plan for regular happenings that support enjoyment and exploration of movement and position in culturally relevant ways, e.g. waiata, kanikani, kapa haka, or games for children to express movement with their bodies, or outings to familiar locations (park, bush area, shops).
 - › As a team, discuss ways to incorporate descriptive language or gesture to identify and model spatial features and positional language, e.g. big, small, under, over, near, long way, away, next to.
 - › Highlight spatial situations within stories, songs, games or daily routines and encourage children to notice different perspectives of movement and location, e.g. "She's underneath, I wonder what she can see from there?"
 - › As a team, identify opportunities for children to explore movement and location in routines and regular events, and plan ways to extend the range of these, e.g. social, verbal, dance, games, pathways between spaces etc.
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Space & Measurement

Lay the groundwork practices

Shapes and how they are used in the environment

Support children's curiosity and exploration of different shapes and how shapes are used in the environment.

Why is this practice important?

When children are curious about and explore shapes, they will try out how different shapes move or fit together. When investigating a spatial problem or posing questions, children use and test out how different shapes 'work' in a variety of situations, including how they can be combined with other objects. As part of this children may develop working theories. Experimenting with shapes, including combining or splitting up shapes, helps children to structure and transform their spatial world.

How to apply this practice in your setting:

- › Take time to collaborate with children and their whānau to learn about children's experiences of shape at home or in the community and respect the cultural knowledge and language they bring.

- › Share with whānau the ways that children experience and explore shape within the setting, e.g. through books, games, puzzles, art, blocks, family play, natural materials, and carpentry.
 - › Identify and review resources to ensure that all children can access a range of culturally relevant materials that enable them to notice features, compare, rotate, flip, pull apart or combine different shapes. Are resources displayed in an inviting and orderly way throughout the setting?
 - › Create a range of opportunities for children to engage in construction and building experiences. Allow time and space for children to select, position, adapt, predict and test out their ideas when exploring, investigating or constructing with shapes. Invite children to revisit these experiences.
 - › As a team, discuss ways to incorporate descriptive language or gesture for the names and features of shapes, e.g. pointy, round, straight. Support children to communicate their thinking and experiences in a variety of modes, e.g. through gesture, movement, sign language, building models or drawing.
 - › Model and encourage children to wonder and question as they explore different shapes and objects that relate to their interests and investigations. Show them how some materials or shapes can be folded, moved or re-shaped, e.g. folding washing or paper, and shaping sand, clay or playdough.
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Space & Measurement

Lay the groundwork practices

Exploring connections between space and measurement

Create opportunities for children to experience and explore connections between space and measurement.

Why is this practice important?

When children explore movement, location and shape they also explore measurement - distance, size and quantity, e.g. a tree is located close to the sandpit (distance), same shaped blocks are different sizes (size), and different shapes made from the same quantity of clay (quantity). Exploring measurement, expands children's understandings of concepts such as similarity and difference, length, height, and area. This helps children to classify, predict, share working theories and solve problems.

How to apply this practice in your setting:

- › Take time to engage with whānau to learn about children's experiences of measurement at home or in the community, and to respect the cultural knowledge they bring.

- › Share with whānau the ways that children might explore and use measurement within the setting, e.g. during block construction, when baking or dancing closer together or further apart.
 - › Identify and plan further opportunities to support enjoyment and exploration of measurement in culturally relevant ways, e.g. navigating distance during siva dance, measuring handspans between seeds when planting. How do you as a team draw attention to the measurement opportunities in everyday experiences or routines?
 - › As a team, discuss ways to communicate about the measurement aspects of movement, location or shape, including introducing rich language, e.g. “Will the fabric stretch twice as far?”
-