



National Day Nurseries Association

★ Brighter thinking
for early years

Maths Outdoors Resource Pack



Maths
Champions

Important: Activities with children must always be risk assessed, including for allergies or choking. Children must always have adequate supervision. Resources and materials must always be appropriate for children's age and stage of development.

Possibilities for maths learning	☒ Counting	☒ Composition	☒ Cardinality
	☐ Subitise	☒ Comparison	☐ Measure
	☒ Shape	☐ Pattern	☒ Spatial awareness

Resources	➤ A copy of the book Whatever Next by Jill Muphy ➤ Grassy or soft surface area outdoors ➤ Two or three boxes for children to travel to the moon in ➤ A basket of items to choose from. Provide items, such as colander, helmet, toys and food for a picnic, cutlery, binoculars, etc. ➤ Optional moon craters. You could use tyres or hoops to represent the craters ➤ Planks to go over the craters.
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Activity Outline	Read the story to the children. Emphasise and use maths vocabulary and language in this particular reading of the story. Tell the children that they will have the opportunity to go the moon just like baby bear in the outdoor area where there are some boxes to use as rockets and items in a basket to choose from for their trip. Support the play by using and encouraging positional language and gestures, e.g. <i>in, into, out, up, down, over, through, under, above</i> etc. when the children are getting into a box, travelling to and from the moon and when exploring the moon, e.g. "We have to go <i>through</i> the clouds" and "That crater is deep, so we'll have to go <i>around</i> it." Counting, cardinality and composition understanding can be reinforced when the children are selecting items for their journey and during the picnic, e.g. "There are <i>three</i> of us and <i>two</i> toys going to the moon. How many cups do we need altogether?" After the picnic, you could suggest a walk on the moon being careful not to fall into the craters by going <i>around</i> them or <i>over</i> them (planks). You could add some tunnels and further equipment if you want to explore other positional language, such as <i>through</i> and <i>under</i>.
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Extension Opportunities	✓ Create a moon buggy for children to move around, or digging sites, to reinforce positional language further ✓ Provide maps for children to follow or ask them to create their own maps ✓ Use stories to explore other types of journeys in the outdoors with the children, e.g. a train, boat, plane or bus journey.
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Resources	➤ Access to nature. Either your setting's outdoor space or a local outdoor space, such as a park ➤ Natural resources to collect, such as pinecones, twigs, sticks, conkers, acorns, stones and leaves. If these are not readily available, then you may need to collect and provide some resources for the children ➤ Recycled containers (one per child or small group of children) to collect their items in ➤ Movable numerals such as number cards, numbered pebbles, numbered wooden spoons. To start with, these can be numbers 1-10, eventually increasing to 20 and beyond ➤ Paper or clay (optional) providing a canvas for the children's creations.
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Activity Outline	• Ensure children are appropriately prepared for the outdoor environment, e.g. warm coats and hats if it's cold, wellies if wet, and suncream and drinking water if it's hot and sunny • Once outside, set an area boundary, particularly if you are using a park or other outside public space • Organise children into pairs or small groups so that they know who they will be working with for the task ahead. Collaborative working helps children to stay motivated and can reduce anxiety around mathematics • Allocate each small group or pair of children one movable number, i.e. a number card, a numbered pebble, a numbered wooden spoon. The allocated number can be random, or you may like to reflect on children's stage of mathematical development, allocating higher numerals to children who have a deeper understanding of number sense • Encourage the children to collect the exact number of objects to match their numeral, e.g. 3 pebbles, 5 leaves etc. This will support children's understanding of counting and cardinality • Engage with children and encourage them to subitise (small amounts) or count out their objects once found, helping them to understand the cardinal number is the number altogether
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	• Extend children's critical thinking skills by asking questions, such as <i>'I can see you have collected three things already, how many more do you need to get all five?'</i>. This supports children's counting, subitising and composition skills, leading to simple mathematical additions. For instance, they may have recognised that they have three objects at a glance (subitising), and understand that the whole number five can be made from part numbers three and two, which means they have two more things to collect. Children will need lots of experience of what five looks like visually to do this so give them opportunities to develop this first • You may want to support children by encouraging them to use their fingers to count and recall the cardinal number • When children have successfully collected their items, invite them to work together to create their own arrangements using these objects • Children can use a range of canvases for the creations. For instance, the ground surface, a pathing slab, paper or a piece of clay • Observe what children do. Some children may make flat arrangements whilst others may create 3D structures. Encourage children to discuss their ideas and creations and if appropriate, introduce dimensional concepts and positional language to support children to develop their shape and spatial awareness • You may also like to take this opportunity to help children explore patterns such as what similarities and differences children notice and is there any units of repetition within their creation. For example, leaf, pinecone, leaf, pinecone, leaf. Composition may also be explored. For instance, a five-object creation made up of three leaves and two pinecones.
Extension Opportunities	✓ Use much larger scale objects in larger spaces. For example, logs and huge leaves in the woodland area. ✓ Explore larger numerals to twenty and beyond, extending children's counting and understanding of cardinality. ✓ Challenge children to create or copy flat or 3 dimensional creations to embed their understanding of these concepts.

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Resources	N/A
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Activity Outline	Count as your child comes down the slide, e.g. "1,2,3!" or count how many swings there are etc. You can also practise spotting 1-5 objects instantly (subitising), e.g. "I see 2 swings over there." As your child explores the various playground equipment, take the opportunity to use mathematical vocabulary. Language, such as <i>up, down, through, over, around, under fast/slow, faster/slower, round and round, balance</i>, etc. can be used during the exploration, for example "The seesaw is balanced now" and "Can you go through the round tunnel?" At quieter times you can also spot shapes or shape properties in the equipment as a separate maths game, e.g. "Let's see how many round things we can find" (e.g. tunnel, wheels, roundabout).
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Resources	➤ Natural materials such as petals, leaves, flowers, pinecones, twigs, etc.
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Activity Outline	Take your child into your garden or family member's garden, on a walk in your local area or to the local park. Talk about how you are going to collect natural items which can be brought home to explore. Take an empty container or bag to collect a variety of natural materials with your child, such as pinecones, flowers, petals, leaves and twigs, etc. As you collect the items talk about what you notice about each object and encourage your child to do the same. Talk about things such as size, shape and weight. Count how many of each object you have and how many items you have altogether e.g. <i>"I think we have five leaves, two small ones and three big ones."</i>, <i>"Altogether we have 10 things in our bag."</i> At home, encourage your child to explore the items. You could support this exploration by talking about the features of items, for example, with a collection of sticks you could help your child to identify which is the longest and shortest, and then order the sticks according to length, or you could group items according to size. You could also group the different items that have been collected and compare amounts, talking about which has the most, least etc. As they arrange the items there will opportunities to talk about positioning (on <i>top</i>, <i>underneath</i>, <i>between</i>, etc.) and the number of items in natural ways. Let your child play with the items and have fun creating different arrangements with them. Take a photo of your child's creation if you would like to keep a memory of it and use it for more conversations.
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Resources	➤ watering cans ➤ jugs ➤ plant pots – various sizes ➤ spades ➤ seeds ➤ soil ➤ rulers
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Activity Outline	During gardening activities, take the opportunity to explore mathematical ideas and vocabulary with your child. Count seeds, plant pots, spades, watering cans, etc. Use the language of <i>one more</i> and <i>altogether</i>, e.g. “We need 4 seeds, we have 3, so one more please” and “We have two small pots and two big pots, so how many pots do we have altogether?” Engage in sorting activities, e.g. separating large plant pots from small pots, etc. Measure out soil and water, etc. using the language of capacity, e.g. <i>full, half full, empty</i> and use jugs with numbers on them, etc., posing questions, such as, “Can you fill this up to the number 4?” When watering plants, get your child to think about how much water a plant needs according to its size Explore the weight of items, such as a bag of soil or the seeds. Use vocabulary such as <i>heavy, light</i>, etc. For example, “This is heavy, we need a wheelbarrow for this bag.” Measure the growth of the plants, by measuring the height at certain points and comparing the heights of trees and plants to children and other family members. Use the language of <i>tall, short, taller/shorter</i>, etc. Talk about the patterns in the natural things around them, e.g. “Can you see the spiral shape on that snail’s shell, it goes round and round.” Talk about the stages of planting a seed using the language of <i>first, second</i> etc. Anything you create for the garden can involve maths vocabulary and discussions, e.g. water features and bird feeders, etc.
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Resources	➤ Bags ➤ Shopping list
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Activity Outline	Prepare a shopping list with your child so they can see how numbers are used for a purpose, e.g. 2 oranges, 3 bread rolls, etc. While walking or travelling with your child, try to spot shapes, numerals and numbers of things around you. You can make this into a game, e.g. <i>"I spy with my little eye something that is round/a circle shape"</i> and <i>"I wonder how many dogs we'll see on the way."</i> You can also try to spot the number of things instantly, e.g. <i>"I see two wheels there. Can you see two wheels anywhere else?"</i> Talk about direction and the position of things, e.g. <i>"It's just around the corner now"</i> and <i>"It's next to the chemist."</i> At the shop, remind your child of how many of an item you need by looking at your shopping list, e.g. <i>"I'll just check the list, ok, we need 2 tomatoes."</i> As well as counting, you can do some more instant recognition of amounts at the shop, e.g. <i>"I see 4 apples in that pack."</i> There may be opportunities to talk about how many items you have altogether, e.g. <i>"We have 2 red apples and 2 green apples, altogether we have 4 apples."</i> Take the opportunity to talk about how heavy or light something is, e.g. <i>"They are nice and light"</i> and <i>"This shopping bag is heavy."</i> Talk about which line is longer or shorter when at the tills.
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Comparison

Having a feel for the relative size of numbers e.g. five is more than two, but 20 is a lot more than three.



Counting

Saying the number sequence, counting objects, and knowing how many there are.



Cardinality

Understanding the meaning of each number, the 'threeness' of three or 'eightness' of eight.



Composition

Understanding that numbers are made up of other numbers e.g. seeing six on the dice as three and three.



Shape and Spatial Awareness

Understanding properties of shapes and the development of spatial thinking e.g. the locations of things and routes to get to places.



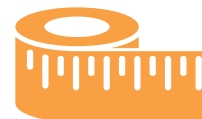
Pattern

Identifying patterns in the environment and routines, understanding pattern rules in order to predict what will come next.



Measure

Using numbers to compare qualities such as a length of weight, using units, such as centimetres or grams.



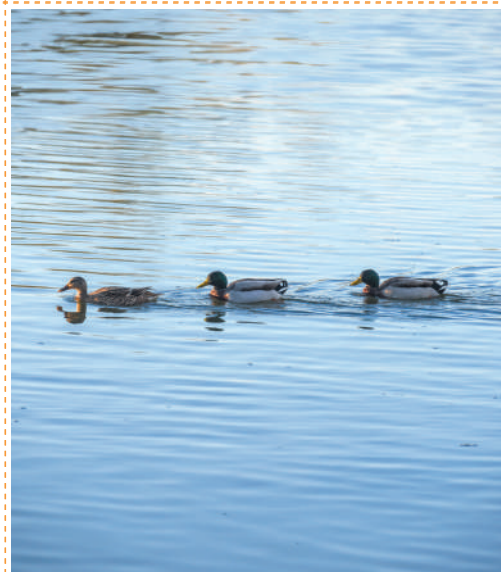
Subitising

Recognising small numbers of things like two and three without counting.



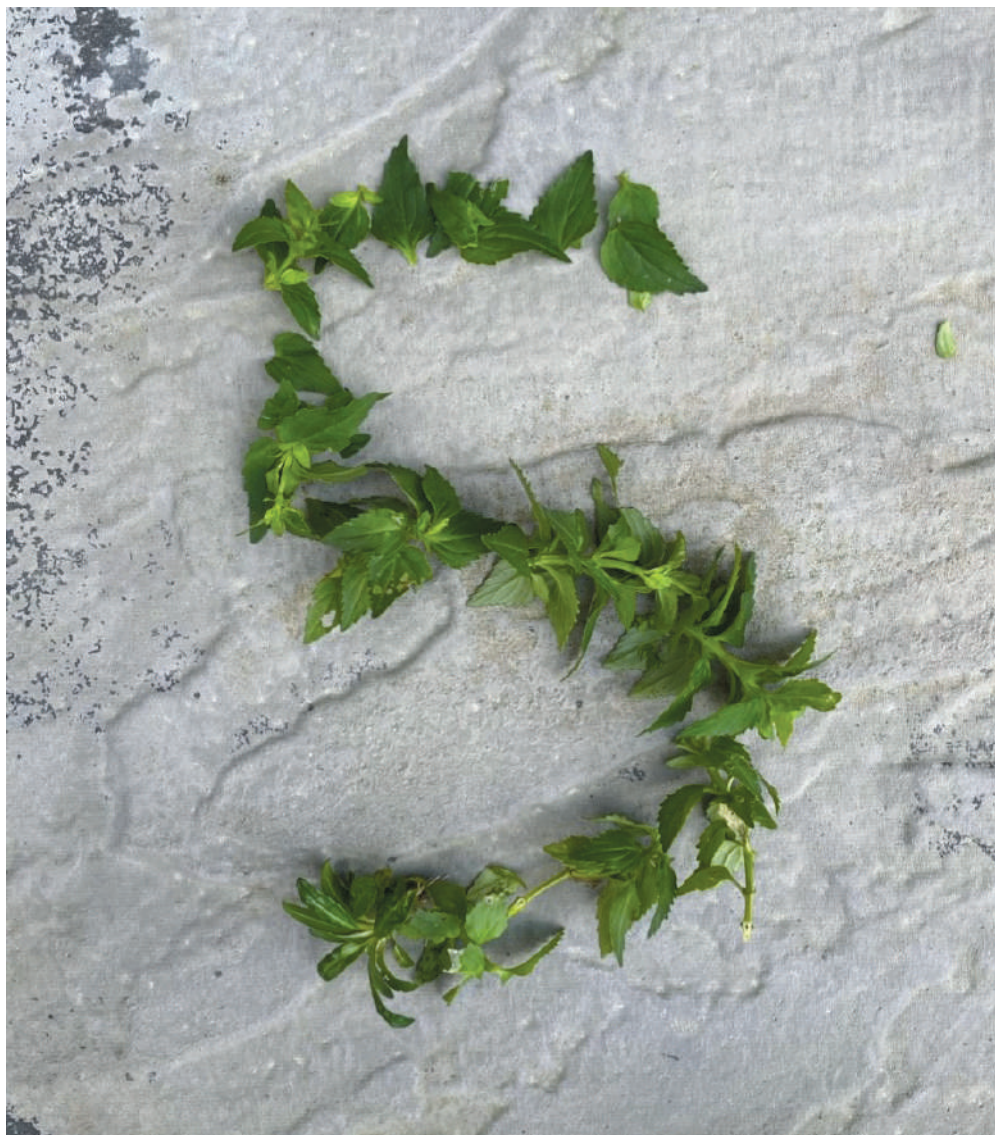
Key Areas of Mathematical Development Memo Cards

+ **=** **÷** **Maths
Champions**























Mud Kitchen: Mini Mud Pie Delights

You will need:

1 big pot



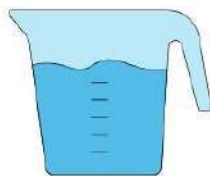
1 large spoon



1 scoop or spade



1 jug of water



4 scoops of soil



8 bun cases



1 small twig



2 flowers



Method

- 1. Mix the soil and water in the pot (add more soil or water as needed)*
- 2. Add to bun cases*
- 3. Decorate each with 1 twig and 2 flowers. Add more if needed.*

Mud kitchen: Really Rocky Mud Pie

You will need:

1 medium pot



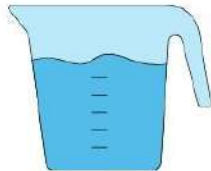
1 large spoon



1 scoop or spade



1 jug of water



1 medium sized bowl



3 scoops of soil



A handful of rocks



4 small sticks



*A sprinkling
of petals*



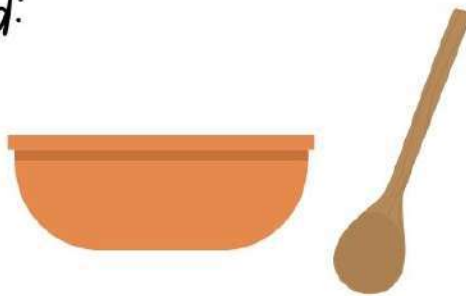
Method

- 1. Mix the soil and water in the pot (add more soil or water as needed)*
- 2. Add the rocks*
- 3. Place the mixture into a bowl*
- 4. Decorate with 4 sticks and a sprinkling of petals*

Mud kitchen: Pinecone Party Pizza

You will need:

1 large bowl
and spoon



1 medium size pizza tray



1 spatula or spoon



1 jug of water



4 scoops of mud



5 pinecones



5 small sticks



A sprinkling of leaves



Method

1. Mix the mud and water in the large bowl
2. Spread the mixture evenly onto the tray
3. Create a repeating pattern with your 5 pinecones and 5 twigs (pinecone, twig...)
4. Bake in the oven for 5 minutes
5. Add some leaves on top

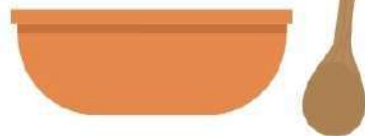
Mud kitchen: Slimy Stew Surprise

You will need:

1 large pot



1 large bowl
and spoon



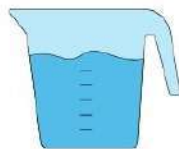
4 small bowls



4 small spoons



1 jug of water



2 scoops of soil



3 small sticks



6 leaves



Method

1. Prepare a slimy mud mixture with the soil and water in the pot
2. Add 3 sticks, 6 leaves and a handful of rocks
3. Pour the mixture into the large bowl
4. Share the mixture evenly between the 4 small bowls
5. Add a sprinkling of petals to each bowl

A handful of rocks



A sprinkling of petals

