

Teachers: Early Years

Balances

Counting up to 10 objects and beginning to count beyond 10
Comparing weights using non-standard measures



Children often enjoy putting objects into different containers such as buckets, bowls, trays and baskets.

Adults could provide an assortment of balances which might have tubs, buckets, pans ... You can even use coat hangers.

The Activity

Place the balances near to areas where children might find items to put into the pans/buckets etc. Many individual items may be suitable, such as cars, cotton reels, counters, shapes, stones, acorns, buttons, fruit ... The list is endless and the children will try objects that would not necessarily occur to you! Simply given them time to explore and experiment.

Encouraging mathematical thinking and reasoning:

Describing

Tell me about what we have here (in one side of the balance) and here (the other side).
What happened when you put that in/on?

Reasoning

Why did that happen?
What happens if it goes here (the other side) instead? Why?

Opening Out

What do you think will happen when you put that there? Why? Try it!
How is that one different to yours?

Recording

Would you like to remember what is here by getting a friend to photo/video you, or by drawing a picture?

The Mathematical Journey

Number

- counting and cardinality - progressing from knowing some number words, to saying one number for each object, then knowing the number of the whole group
- counting an irregular arrangement of objects
- finding the total number of items in two groups by counting all of them
- relative number size - comparing numbers
- part-whole numbers – noticing numbers within numbers
- selecting the correct numeral to represent 1 to 5, then 1 to 10 objects
- beginning to use the vocabulary involved in adding and subtracting

Same and different:

- developing language to compare and contrast e.g. more, fewer, heavier, lighter ...
- ordering according to a rule e.g. heaviest to lightest, tallest to shortest ...

Size and measures:

- comparing weights using non-standard measures

Development and Variation

You could set up a role play area which might encourage children to explore the idea of weight a bit further. For example, how about an airport check-in desk where luggage is weighed, or a post office, or a shop selling fruit/vegetables?

The NRIC Early Years activities [Presents](#) and [Packing](#) also give opportunities for similar areas of mathematics to be experienced. [Golden Beans](#) may also be useful for offering further ideas in which to explore comparing and contrasting in the context of number.

Resources



As many different examples of balances as you can gather - see the pictures above
A variety of objects that can easily be placed in/on the balances.
A camera may also be useful.

Photo acknowledgements from left to right: learningandteachingwithpreschoolers.blogspot.co.uk, librarymakers.blogspot.co.uk, wormseye-view.blogspot.co.uk, tts-group.co.uk, www.evans-crittens.com

nrich.maths.org/early-years
© University of Cambridge



Calendar Muddle

Ordering familiar events
Talking about days of the week and calendars



Children often enjoy keeping track of events with visual timetables and calendars.

Adults could take photos of regular events during the day with the children to make a timetable with removable pictures.

The Activity

When the children are familiar with the timetable, take all the pictures off and ask the children to help you put them back in order. Then muddle them up and ask them to help you sort them out.

Encouraging mathematical thinking and reasoning:

Describing

All the pictures have come off. Can we put on all the activities in order? What do we do first? Which activity do we do first/next/after... /before...? What day comes after today? Will it be yesterday/tomorrow? What day comes after/before Tuesday? How many sleeps is it until the weekend/our outing?

Reasoning

How do you know that goes there? First we have lunch, then we wash our hands. Oh isn't that right? Why not? Is it right that we go home first thing?
Invite children to make up 'silly' sequences and explain why they are silly.
What things would you like to do in a day? In what order and why?

Opening Out

Can we start at home time and work backwards? Can we put the days of the week in order, but start with.... Tuesday?
Our duck eggs will take a week to hatch - when will that be?

Recording

Can you take photos and make your own timetable?
What would your favourite day look like from getting up to going to bed?
Can you find a way to record how many sleeps it is up to your birthday, to show your friends?
How can we record how long our duck eggs will take to hatch so that we remember?

The Mathematical Journey

Counting and Cardinality

- Counting for a purpose.
- Cardinal principle - the last number you say tells you how many.

Number Symbols

- Recognising numerals e.g. numbers on a clock, birthday date on the calendar.

Measures - time

- The vocabulary of 'before', 'after', 'next' and times of the day e.g. afternoon, lunchtime, 3 o'clock.
- Duration of time in days or 'sleeps'.

Development and Variation

Use other events for 'countdowns' on the calendar e.g. children's birthdays, celebrations, holidays.

Use growing things to predict when things will happen e.g. seeds germinating, sunflowers appearing.

Mix up photos of sequences, such as cooking or craft activities and ask children to put them in the right order; make pictorial concertina books of instructions to refer to.

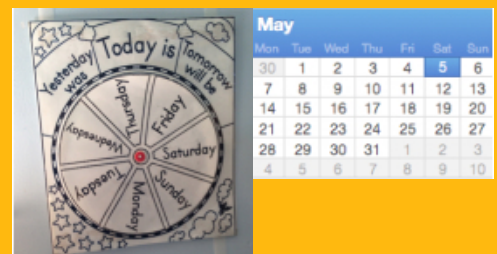


Resources

- Photos of daily events (or pictures, available from various sources.)
- Tape and velcro to attach pictures
- Paper and sticky tape for making concertina books of instructions.

Arnold Lobel (1972) "Frog and Toad Together": a list - this is a very funny story about Toad making a list of things to do in a day and then losing it.

<https://www.youtube.com/watch?v=tqQiBsAuDZ8>



Download a [.pdf](#) of this resource

Acknowledgement: Helen J Williams; Eastwood Nursery School



nrich.maths.org/early-years
© University of Cambridge



Teachers: Early Years

Cooking with Children

Using everyday language to talk about size, weight, capacity and volume.



Children often enjoy joining in with cooking activities.

Adults could provide recipes and equipment, and a safe environment for the children to cook.

The Activity

Children love to cook! It encourages their independence and increases awareness of healthy eating choices. Cooking can also be rich with mathematical language and thinking. The children can follow a simple recipe to bake and cook, from gingerbread men to bread. (It should be noted that this activity works best with small groups of children.)

Encouraging mathematical thinking and reasoning:

Describing

Tell me how we are going to make ...
How much flour (etc.) will we need?

Reasoning

What if the mixture is too wet/dry? What do we need to add more of/less of?

Opening Out

Provide further opportunities for children to follow recipes. For example, they could make play dough

Recording

Would it help you remember what is here by taking a photo?
Could we draw/write something so someone else could have a go at making ...?

The Mathematical Journey

Counting skills:

- saying one number for each object (e.g. when counting out ingredients and spoonfuls)
- remembering the pattern of the number sequence
- understanding cardinality i.e. that the last number gives the total

Shape, space and measure:

Following a simple recipe to:

- use everyday and mathematical language to describe size, weight and quantity (e.g. half, quarter, a little, a lot, heavy, light, kg etc.)
- use scales to weigh out ingredients

Development and Variation

It is good to involve the children in the whole process, if possible. You could start with writing shopping lists, maybe include a trip to the shops to buy ingredients and then allow the children to cook as independently as possible. Encourage the children to read the recipe themselves, counting ingredients and how many spoonfuls or cups they will need.

It is important that the children use their critical thinking skills when following the recipe. Sometimes they might add a small spoonful which won't be enough. With support, they will need to think about how to fix this problem. A recipe using spoonfuls requires children to use their counting skills, but you could use a weighing scales or cups to encourage different levels of mathematical thinking.



Resources

A collection of simple recipes that use visual cues and written number (see nrich.maths.org/10668 for templates). Try to include a range of different recipes that require increasing skill and mathematical thinking.

A bowl and mixing spoon for every child - this is important as it will increase independence and mathematical thinking for every child.

Attractively presented and easily accessible ingredients for children to use in their recipe.

A camera might be useful for taking pictures.



Download pdf [here.pdf](http://nrich.maths.org/10668)

With thanks to Anna Tanton and children at Ludwick Nursery School who were the inspiration for this activity.



nrich.maths.org/early-years
© University of Cambridge



I Have a Box

Using everyday language to describe and compare quantity, size, weight, capacity and position. □



Children often enjoy guessing, counting and imagining.

Adults could provide a variety of sealed boxes, provoking children to discuss what might be inside.

The Activity

Show the children a sealed box containing a range of objects which differ in size, weight and ability to rattle! Ask them what might be inside the box and following this up with questions to encourage them to think and apply their knowledge and past experiences. Try to build up the suspense so as to hook the children in!

Encouraging mathematical thinking and reasoning:

Describing

Tell me (a bit more about) what you think is inside the box.
How big is it/are they?
How many of them are there, do you think?

Reasoning

Why do you think it is/they are inside?
Why do you think it is/they are that size?
Why do you think there are that many?

Opening Out

Can you find another box that could just hold a ...?
How many ... could you fit inside?
Here are some other different boxes. How many ... could you fit into each of them?

Recording

Would you like to make a drawing of what's inside this box?

The Mathematical Journey

Measures:

- developing language to compare and contrast e.g. bigger, taller, longer, shorter, heavier, lighter, wider, narrower ...
- noticing that you get more smaller objects in a box, bigger things take up more room and there are fewer of them

Properties of objects:

- choosing particular boxes for particular objects having analysed the properties of the objects involved and how many there will be
- using everyday language such as curved, pointy, straight, wiggly to describe objects then progressing to using mathematical language such as circle, square, rectangle, triangle, oblong where appropriate

Counting and cardinality:

- counting and cardinality - progressing from knowing some number words to saying one

Development and Variation

The activity called "[Presents](#)" in the NRICH EYFS collection could be a follow-up to this one. It focuses on ordering wrapped presents according to their weight.

Once the contents of the box have been revealed, you could challenge children to put specific numbers of objects inside it. Listen out for reasoning that reflects the fact that smaller objects take up less space, therefore more of them can be fitted into the box compared with larger objects.

You could add context to this activity by linking it to a recently-read story or role-play theme. The boxes could become, for example, suitcases or trunks.



Resources

In addition to the box/boxes, you will need a selection of objects which differ in

- size
- weight
- rattling ability.

Try to select items that the children are used to seeing in the setting, or have experience of from elsewhere.

With thanks to Kirsty Lombardi at Ludwick Nursery School who was the inspiration for this activity.



Long Creatures

Using everyday language to talk about size
Exploring characteristics of objects and using mathematical language to describe them



Children often enjoy making things out of thin card, pretending they've made worms, snakes, caterpillars, lizards etc.

Adults could provide craft materials for children to decorate, or other materials like linking cubes to make long narrow shapes.

The Activity

Provide thin card, that is long and narrow, for children to fold in different ways to make creatures that vary in length. Linking cubes, pipe cleaners etc. could also be used.

Encouraging mathematical thinking and reasoning:

Describing

Tell me about the long creature that you've made.
How does yours compare to the others that your friends have made?

Reasoning

Tell me about making it longer/shorter.
If you were to put yours with other ones what could you say about them?

Opening Out

Can you find a way of making it longer/shorter than any of the others?
Have a look at everyone's creatures.
Could you group them in some way?

Recording

Do you want to make a label for your creature and give him/her a name?
How could you show how long your creature is?

The Mathematical Journey

Properties of shapes

- discovering the best shapes to use by analysing their properties

Position and spatial properties:

- investigating how all the creatures that they make can be extended
- comparing the positions of creatures

Same and different:

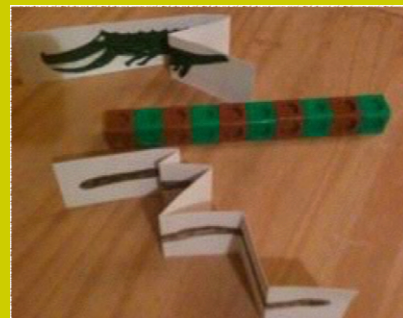
- comparing the shapes and sizes of all the creatures that they make, in particular describing relative lengths i.e. comparing their creature's length before and after extension and/or comparing the length of their creature with another child's

Development and Variation

Similar mathematical discussions could arise from play with modelling clay, play-dough or plasticine, for example.

Children might also enjoy using ribbon/wool/string to go around different objects and realising the need for it to be longer.

Similarly, children could be given presents and wrapping paper. This may provoke discussions about the size of the piece of paper in relation to the size of the present.



Resources

You will already have lots of materials in your setting which would lend themselves to this activity. You might provide:

- materials which have the potential for creating long creatures, and perhaps are able to be decorated
- fabrics or other items that can be stretched or made shorter

A camera may be useful to take photos of the creatures.



nrich.maths.org/early-years
© University of Cambridge

Making Caterpillars

Comparing lengths using non-standard measures
Describing 3D shapes



Children often enjoy using modelling clay to create long thin rolls of dough, like caterpillars.

Adults could support them to compare the lengths and thicknesses of their models and to use linked cubes to measure them.

The Activity

Provide children with modelling clay and pictures of caterpillars, and invite them to create their own caterpillars.

Encouraging mathematical thinking and reasoning:

Describing

What will your caterpillar be like? How can you make one?
Tell me about your caterpillar.
How is your caterpillar similar to/different from ...?

Reasoning

Can you make a train of linked cubes the same length as your caterpillar?
How long is your caterpillar?
Who has made the longest caterpillar? How do you know?
Who has made the shortest caterpillar? How do you know?

Opening Out

How could you make a longer one?
How could you make a shorter one?
How could you make a heavier one? A lighter one?

Recording

Draw a picture or take a photo to show how long your caterpillar is.

The Mathematical Journey

Properties of shapes:

- using everyday language to describe, for example, length, weight, thickness, thinness, hardness, softness and how these properties change as the children make the caterpillars

Same and different:

- developing language to compare and contrast different caterpillars e.g. longer, shorter, thicker, thinner ...

Size and measures:

- measuring lengths, weights etc in different ways
- understanding that the more dough is used, the heavier the caterpillar will be

Development and Variation

Children are often fascinated by watching caterpillars. A caterpillar hunt might be a suitable introduction to the task.

Children might also compare:

- lengths of different familiar objects such as shoes, scarves, skipping ropes
- weights of household objects and groceries such as pieces of fruit.

Story, rhyme and song links

The Very Hungry Caterpillar by Eric Carle is, of course, a popular and familiar story. It offers opportunities to make cross-curricular links and links to counting and number comparisons, as well as the order of the days of the week.

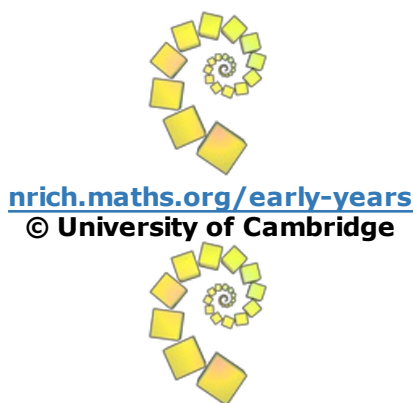


Resources

- Play dough/plasticine/modelling clay/salt dough
- Equipment for measuring caterpillars, where appropriate, such as interlocking cubes, counters, rulers, balance scales
- Photographs of caterpillars

This activity is adapted, with permission, from 'Mathematics Through Play in the Early Years' by Kate Tucker

Photo acknowledgements <http://www.kidsbutterfly.org>



nrich.maths.org/early-years
© University of Cambridge

Mud Kitchen

Using everyday language to talk about size, weight, capacity, position and distance
Explore characteristics of everyday (kitchen) objects and using everyday language to describe them



Children often enjoy digging in soil (mud), filling containers and emptying them, engaging in imaginative play and talking freely.

Adults could provide an assortment of all kinds of objects from a kitchen - pots, pans, a water supply, large and small kitchen utensils etc.

The Activity

Create a child-initiated mud kitchen play area where a small number of children at a time can explore, imagine and create.

Encouraging mathematical thinking and reasoning:

Describing

Tell me about this ...
What's over there?

Reasoning

Why do you need that other pan/pot/ladle/spoon ...?
Is there anything else you can think of that could be here? Why would it be useful?

Opening Out

What would you like to do with this?
Here are some new ... (items not seen before).
Is that pan/pot/ladle/spoon big enough? (Can you find one that is?)

Recording

Would it help you remember this if you took a photo?

The Mathematical Journey

Counting

- saying one number for each object (e.g. when voluntarily counting the number of pots/dishes filled with mud!)
- remembering the pattern of the number sequence
- understanding cardinality i.e. that the last number gives the total
- beginning to use counting to solve practical problems e.g. sharing out pots amongst the group

Same and different

- describing the utensils and what they are doing using the language of comparison e.g. bigger, smaller, taller, longer, shorter, wider, narrower ...

Shape, space and measure

- using everyday words and mathematical words to describe utensils or what they have made e.g. "I want a round jar!"
- using everyday words to describe position e.g. "The pot's behind all the spoons!"
- using everyday words to describe capacity and ordering items according to capacity

Development and Variation

Very similar mathematics could result from water play and sand play, both of which encourage exploration of shape, size and capacity.

Children's thinking could be extended to include ideas about weight by introducing a balance or see-saw into the environment.

Giving children opportunities to explore any new area that you have created will result in them 'doing mathematics', whether they are using ideas associated with number, shape, position or measures, or a combination of the above!

Resources

Obviously, an outdoor area with soil is necessary!
Other useful items include:
Kitchen utensils (pots, pans, spoons, spatulas etc.)
Large cable drum (to use as a table)
Play cooker
Small blackboard
Water
De-commissioned microwave oven
A range of sizes of plastic tubs



Photo acknowledgements <http://www.letthechildrenplay.net/2010/03/ways-to-incorporate-mud-play-into.html>

Presents

Comparing weights using non-standard measures
Describing size and exploring 3D shapes



Children often enjoy giving and receiving presents.

Adults could provide an assortment of wrapped presents for the children to explore, making sure that some are small but heavy and others are light but large.

The Activity

Place the presents in an area where children can explore them easily. They could be birthday/wedding/festival ... presents, perhaps linked to a book you have read recently or to the time of year. Encourage the children to make predictions about the weight of the presents.

Encouraging mathematical thinking and reasoning:

Describing

Tell me about this present.
What's the same about these two presents?
What's different?
What does this present remind you of?

Reasoning

Do you think this one will be heavier/lighter than that one? Why do you think that?
How will you test out your idea? Are you surprised? Why or why not?
Which do you think is the heaviest/lightest? Could we arrange them in some way?
Why have you put that one there?
Could we arrange them in a different way?

Opening Out

What kind of thing do you think might be inside this present?
Why do you think that?
Can you find something that you think is the same weight as this present?

Recording

(If the children have grouped the presents somehow)
What can we do to remember this order/arrangement?

The Mathematical Journey

Same and different:

- developing language to compare and contrast e.g. bigger, taller, longer, shorter, heavier, lighter, wider, narrower ...
- ordering according to a rule e.g. longest to shortest, heaviest to lightest, tallest to shortest ...

Size and measures:

- understanding the difference between size and weight i.e. a large present is not necessarily heavy
- comparing weights in different ways e.g. by lifting, using balance scales (or even kitchen scales/bathroom scales)

Development and Variation

Any objects could serve as the stimulus to this activity. They don't necessarily need to be wrapped, although of course, the wrapping can help challenge children's preconceptions about size and weight.

You could create a 'gold bar' made from a block of polystyrene or other very light material. Paint the block with gold paint and handle it in such a way as to give the impression that it is very heavy. You could pass it to children in turn and support discussion about their surprise when they take it from you. Setting up an airport in your role play area might encourage discussion about weight as children check-in their luggage. Alternatively, a fruit and vegetable shop role play may provoke similar discussions.



Story, rhyme and song links

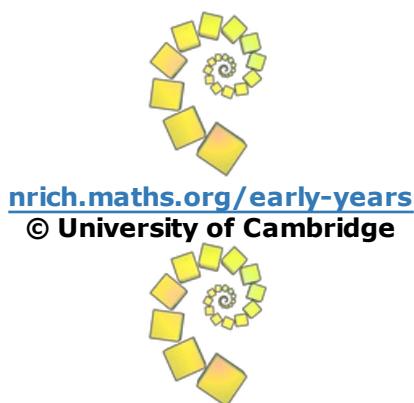
Any story which might involve presents would be a great context in which to explore this activity, for example wedding presents in Cinderella.

Resources

A collection of objects, varying in size and weight, wrapped as presents (try to include some items that are heavy but very small and some large, light items).

Balance scales and/or other types of scales such as kitchen/bathroom, should the children request them.

A camera may be useful for taking photos.



Sock Washing Line

Using everyday language to talk about size and position, comparing and ordering by size
Counting in ones and twos



Children often enjoy finding matching pairs and pegging things up.

Adults could provide a collection of socks of different sizes (including dolls, baby and adult socks, long socks and short socks) to sort into pairs.

The Activity

Set up a long washing line with pegs and a washing basket of different size socks, so children can find pairs and peg them up. For this activity the focus is on size and length, rather than colour or pattern, providing opportunities for comparing and ordering. Include some odd socks.

Encouraging mathematical thinking and reasoning:

Describing

Tell me about the socks you've found/sorted out/put on the line already.
Why do you think those aren't a pair?
Where do you think these ones should go?

Reasoning

Have we got room for any more? Have we got enough pegs?
Is that the longest sock? Are you sure?
Why do you think those don't go there?

Opening Out

Have we got enough socks for these doll for all the class? How can we find out?
What if we order all the socks going from the baby ones to the biggest ones?
Can we count them in 2s? What do you notice when you count in 2s?
How many pairs of baby socks are there?

Recording

Can you think of a way to show how many of each kind of sock we have, so we can check that we haven't lost any?

The Mathematical Journey

Counting

- remembering the number sequence, saying one number for each object
- cardinality -the last number tells you how many there are
- counting in 2s
- counting pairs as units

Pattern

- noticing the alternating pattern when counting in 2s

Measures

- using language to compare size e.g. bigger, smaller, longer, shorter, much (a little) longer/shorter

Shape and space

- using positional language e.g. next to, between, after, before. . .

Development and Variation

Children could peg all the pairs up in size order.

They could find socks for dolls or teddies, or for the members of their families.

They could start a sock shop, pricing the pairs of socks in pounds and paying with plastic pound coins

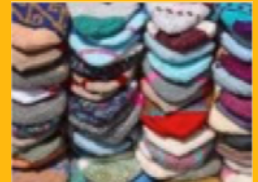


Resources

A collection of socks, including baby and adult socks, long and short socks, and some odd ones.

Washing line and clothes pegs.

A number line to help children count in 2s.



Acknowledgement: Helen J Williams

nrich.maths.org/early-years
© University of Cambridge



The Spring Scale

Comparing and talking about weight



Children often enjoy filling cartons that are suspended in elastic (informal spring scale) to see how far they go down with different items.

Adults could cut cartons in half, punch a hole in each side and thread with string, suspending them on thin elastic bands taped to a wall/cupboard. A selection of small everyday items of different weights can provide surprises.

The Activity

Children choose items to put into the cartons and discuss why some items pull the carton down further than others. They can then predict for new items.

Encouraging mathematical thinking and reasoning:

Describing

What do you see? What are you noticing?

So what do you notice, Helen? Hmm ... go on ... Say a little

What happened with the orange? Did it go down a lot further or a little further?

Reasoning

What do you think is happening this time?

I wonder why we are getting different things happening?

Why do you think that? What about you, Jordan?

Opening Out

I wonder what will happen with the sponge and the pebble? And the banana?

What do you think?

How sure are you?

Why do you think our prediction was wrong? What about you?

Recording

Can you make a mark where you think the bottom of the carton will stretch to?

What do the marks tell us? What happened?

Maybe use a different colour for your guess and what really happened.

Which is your guess and which is Amir's?

The Mathematical Journey

Measures

Using language:

- lower than, higher than; half-way; not / nearly as far as; further than
- heavier / lighter than; a little / a lot heavier; nearly as heavy as;
- heaviest / lightest; exactly the same weight as; equal to;
- comparing weights of two objects
- ordering weights of several objects

Explaining: 'the orange is heavier because it went down further' and 'the one that did not go down as far is lighter.'

Development and Variation

Fill the carton using different things:

- some larger and lighter (e.g. a sponge)
- some smaller and heavier (e.g. a stone)

Go 'big' and outdoors: suspend a hanging basket from a bracket with a bungee spring.

Investigate: e.g. Do the heaviest cars go down the ramp?

See what happens with greengrocers' scales or digital luggage scales.



Resources

- cartons for fruit juice, milk or soup (well washed), string, hole punch, long thin elastic bands, tape
- a collection of fruit, vegetables, toys and everyday objects of different mass, some lighter (eg. sponge, pumice stone, shells, plastic toys, pine cones), some heavier (e.g. pebbles, a bunch of keys, oranges)
- paper on the wall or a board, different coloured pens.

See this clip of Helen talking with a group of ITT students about spring scales:

<https://www.youtube.com/watch?v=YUDzLOVPZM8>



Timing

Counting and comparing numbers
Timing using non-standard and standard devices



Children often enjoy putting similar items together in pots/baskets/trays.

Adults could build on this by providing devices, such as sand timers or digital timers, that children could use to time themselves as they fill up the container.

The Activity

Place a variety of timing devices (such as different sand timers and digital timers) near to a collection of small easy-to-hold items such as marbles, shells, buttons etc. and some containers. Ask children how many marbles/shells/buttons they think they might be able to put in one of the containers before the sand runs out.

Encouraging mathematical thinking and reasoning:

Describing

Tell me about what you're doing.
How many marbles did you get in that time?
How many did you get in last time?
What will you try next?

Reasoning

Who has got the most marbles in their pot? How do you know?
What could you do to make sure you get more marbles in your pot this time?

Opening Out

What would happen if you used this different timer?
What would happen if you only used one hand/used both hands?
What would happen if you used this different pot?
What would happen if you used, for example, buttons instead of marbles?

Recording

How will you remember how many marbles you managed to get in the pot that time?

The Mathematical Journey

Number

- counting and cardinality - progressing from knowing some number words, to saying one number for each object, then knowing the number of the whole group
- relative number size - comparing numbers

Measures:

- comparing lengths of time
- measuring time using different devices
- using everyday language to talk about time

Capacity:

- understanding the idea that a large object takes up more space in a container than a small object

Development and Variation

How about asking the children how many marbles they could take out of the jar before the sand runs out?

Following on from that, how long would it take to remove all the marbles?

Alternatively, rather than asking children how many marbles they can put in a pot in a given time, you could turn the task the other way round and ask them how long it might take to put, for example, 20 marbles in the pot.

This is more of a challenge as it requires them to find ways of timing themselves, which is where a digital timer might come in useful.

This can lead onto children trying to get quicker and quicker at putting a certain number of marbles in a pot.

How will they know that they are getting quicker?

You could build on this idea further by making the most of opportunities to measure lengths of time which may come up in your everyday routine.

For example, can the children tidy away in less time than they did yesterday?



Resources

Collections of small objects, such as marbles, shells, buttons, counters, corks etc. and a range of different containers, for example baskets, trays, pots etc.

Different ways of measuring time, for example sand timers, and even easy-to-use stopwatches

Paper, clipboards, pencils for children to record should they wish

Water, Water ...Comparing capacities
Counting

Children often enjoy playing with water, pouring and filling containers.

Adults could set up a water tray with coloured water and some bottles and flasks of varying dimensions, with some plastic cups.

The Activity

We want to take some bottles of lemonade (homemade!) to the park for our outing. Which bottles will hold the most?

Encouraging mathematical thinking and reasoning:**Describing**

What do you notice about the bottles? How are they different?
What happens if you pour this one into this other one?

Reasoning

How can we find out which hold the most?
How do you know which one holds more?

Opening Out

How many cups will they each fill up?
Can we put them in order from the smallest to the biggest / from which holds the most to the least?

Recording

Can we put labels on the bottles to help us remember how much is in them?

The Mathematical Journey

Same and different

- Discussing how some containers are different shapes or have a greater capacity than others, progressing from just 'bigger' to 'shorter', 'fatter', 'taller', 'thinner' and 'holds more than'.

Counting and cardinality

- counting how many cups are filled

Matching numerals and amounts

- Making labels to show how many cups each bottle hold

Properties of shapes

- Describing shapes e.g. 'round', 'bendy' or 'straight' and 'square'.

Size and measures

- explaining how they know containers hold more: 'this is smaller because when you pour from the bigger one it overflows'; 'This is smaller because when you pour it into the bigger one the water only comes up to there'; or 'This is bigger because you get 6 cups and that one only fills 4 cups.'

Conservation

- explaining that the water levels are different in different containers because . . .

Development and Variation

How much lemonade do we have to make so that everyone can have a cupful? Two cups-full?

Plan for a smaller group of children, or some toys having a party.

Pour one cupful of coloured water into each of some tall, thin and short fat transparent containers. Discuss what happens to the water level in each and why.



Resources

A varied collection of bottles, containers and flasks for lemonade and cups

Funnels, jugs and tray

A collection of transparent containers - some short and fat, some tall and thin

Food colouring



nrich.maths.org/early-years
© University of Cambridge



Wrapping Parcels

Using everyday language to compare quantities and objects
Exploring characteristics of everyday objects and shapes and describing them
Comparing and writing numbers



Children often enjoy wrapping up parcels.

Adults could provide a role-play scenario such as a birthday party, a post office or a giftwrap service, where children can experiment with wrapping boxes.

The Activity

Children choose some toys to wrap up as presents. Model wrapping a present where the paper doesn't fit and then show how to allow enough to overlap and stick down. Offer boxes, paper and resources for wrapping parcels.

Encouraging mathematical thinking and reasoning:

Describing

How much paper will you need for that one, do you think?
How will you check you have enough?
How are you going to wrap it? Tell me how you wrapped it – what did you do first? Which box will you choose for your present? How are the boxes different?

Reasoning

Is this big enough? Is this enough sticky tape? How do you know?
How do we know where to put the box on the paper to wrap it?

Opening Out

Is there another way of wrapping that takes less paper? Less tape?
How much shall we charge for posting this parcel? What about this big/much smaller one?
How much shall we charge for the jiffy bags?
How much does this parcel weigh? What stamp should we put on?

Recording

Can you make a price list for posting the different parcels? For the jiffy bags?
Can you write the address on the label? Which is the house number?
Can you make a label to show what the parcel weighs?

The Mathematical Journey

Measures

- using comparison language e.g. much, a little, bigger, larger, smaller, taller, longer, shorter, wider, narrower, heavier, lighter
- estimating the area of the paper needed to cover all the box faces (and to overlap)

Shape and space

- using positional language such as under, over, round, sideways, on top, underneath . . .
- developing language to describe cuboids e.g. edge, corner, side, face . . .

Number

- using symbols appropriately e.g. house number, price or weight

Development and Variation

Suggest a birthday party for a toy such as a teddy. What might Teddy like? Offer different-sized boxes and gifts and let the children choose one to put in a box and wrap up.

Some children may have played 'Pass the Parcel' at parties. Suggest that they make their own 'Pass the Parcel' with a surprise at the end and use these for a real game.

Set up a post office, with boxes and jiffy bags of different sizes. Provide scales and make price lists for parcels of different weights. Children can use pretend stamps in different amounts.

See the NRICH EYFS activity Presents, for children to investigate relative weights: <https://nrich.maths.org/content/id/9720/Presents.pdf>

'Mister Magnolia' by Quentin Blake is a story about receiving a surprise parcel.



Resources

- wrapping paper – plain or patterned (by the children)
- sticky tape in dispensers
- string/ribbon of different lengths
- scissors
- boxes of different size and shapes (cuboids are easiest to begin with)
- jiffy bags in different sizes
- weighing scales - preferably balances
- pretend stamps and money
- paper and pens to make price lists
- labels (sticky/tie-on)

Acknowledgements Helen J Williams