

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

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Teachers: Early Years

Beat the Clock

Children use everyday language to talk about time, to compare quantities and to solve problems



Children often counting actions and seeing if they can do things more quickly.

Adults could time children's activity for a minute and suggest things to do.

The Activity: set a timer for a minute (or half a minute) and count how many actions the child can do in that time, such as star jumps, hops, or writing their name.

Encouraging mathematical thinking and reasoning:

Describing

How many star jumps did you do? How many hops? Which did you do more of?
Did you do more or fewer than last time?
You did more jumps - does that mean you are getting faster or slower?

Reasoning

What do you think you can do more of in a minute, star jumps or twirls? Why do you think that is?
Try again - can you do more this time?
What makes you think you are getting faster? Or slower?

How many times do you think you can do 'heads, shoulder, knees and toes'? How many claps or stamps do you think you can do in half a minute?

Opening Out

Can you think of some other actions you can do in a minute? Writing your name? Singing happy birthday all the way through?
Can you put your coat and shoes on in a minute?
Stand up with your eyes shut: sit down when you think a minute is over. How close were you? Did you think a minute was a shorter or longer time than it really is?

Recording

Shall we write down how many jumps you do each time, so we can keep track. Track do these show?

The Mathematical Journey

Counting and cardinality:

Counting actions: using the number sequence, tagging each item and saying the total

comparing quantities and numbers, more / less / fewer / not as many

ordering several numbers most / biggest number / smallest number

estimating numbers

Matching numerals and amounts:

writing and reading numerals

Measures:

using language: quick / fast / faster / slower; takes a long / short time

predicting and explaining that the shorter time things take the more you can do in a minute (and vice versa): 'Clapping is really quick so you can do lots'.

generalising: 'if it takes a long time you get a small number'.

Development and Variation

There are a huge variety of activities which children might suggest, some very brief, like clapping (or blinking!) and some taking longer, like twirling round (or winking!). Outdoor activities might include running/hopping the length of a path, or throwing and catching a ball. Indoor activities might include saying a rhyme or singing songs.

Longer activities, such as running round a circuit, can be timed to the nearest minute and the number discussed. Does a smaller number of minutes mean that you are getting slower or faster - and why? Timings for daily activities such as getting dressed or tidying away toys can be recorded and compared.

You should brush your teeth for two minutes (twice a day) - can you guess when two minutes is up?

Resources

You can use the digital timer on a phone, or a wind-up kitchen timer which 'pings'. Egg-timers may be less effective as they do not make a noise when the time is up (and do not provide options and numbers to discuss).

A number track or ruler of some kind is useful to refer to, for children to see how to write the numbers.

You can make a 'tocker' with a coffee jar lid, a lump of playdough or blutak, and a piece of card stuck on to provide a pointed 'handle', on which you can draw a face and hat. Pull the point so it is flat on the table and then release it: the lid should 'tock' several times to and fro before coming to rest. Use this time period to see how many things you can do. Or make tockers with different lids or amounts of playdough and set them off at the same time to see how long they keep tocking.



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.

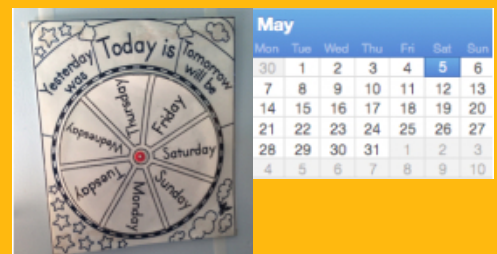


Resources

- 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



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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.



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Teachers: Early Years

How Long Are You?

Children use everyday language to talk about size, to compare quantities and objects and to solve problems



Children often enjoy measuring themselves with different things

Adults could provide a variety of things to use as measuring units and compare results.

The Activity

The child lies down and the adult 'measures' the child, by putting a marker by head and feet, then stretching a piece of tape as long as the child. They find out how many pens will match this, carefully placed end to end, making sure they are straight, with no gaps or overlaps. Repeat with other things of uniform length, some long, some short (such as rolled up sheets of newspaper, spoons, buttons, Lego or Duplo bricks) to make several 'trails' of equal length and compare the results.

Encouraging mathematical thinking and reasoning:

Describing

What do you notice about using the pens and the paper rolls? How many pens does it take to match the tape?
You are 20 pens tall! How many paper rolls tall are you?
You are 3 and a bit rolls long / not quite 3 rolls long.

Reasoning

I wonder what will happen if we measure with Lego bricks? Why do you think there will be more?
There are some gaps between the dinosaurs – do you think that matters? Does it matter if they are all not the same length?

Opening Out

Which did we use most of? Which needed the smallest number?
You are three and a bit rolls long – what do you think we could use to measure the extra bit - little Lego bricks?
How many pens tall do you think your grown-up will be?
What other things are about the same height as you? Which are shorter or taller?
How tall are you with the measuring tape - what numbers can you see? Are you more or less than a metre tall?
How many footsteps tall are you? (Make sure you walk heel to toe and in a straight line!)

Recording

Let's take a photo of the 'trails' we've made.
Let's write the numbers of papers and pens, and centimetres tall you are. How can we make the calculator show these numbers?

The Mathematical Journey

Counting and cardinality:

counting objects using the number sequence, tagging each item and saying the total

comparing quantities and numbers, more / less / fewer / not as many

ordering several numbers most / biggest number / smallest number

estimating numbers

Matching numerals and amounts

Writing and reading numerals

Measures

using language: tall, height, long, short, longer, length

predicting and explaining that the shorter things are the more you will need and vice versa: 'The buttons are really small so we will need lots'

generalising: 'If you get really long things you don't need as many'

Development and Variation

Predict and compare the number of things needed to measure an adult.

Cut a piece of string the length of the child - or use strips of newspaper joined together with sellotape - and try to find things the same length, commenting whether they are shorter or longer.

Tape pieces of newspaper together, draw round the child with a marker pen and cut out the silhouette, then mark the length in a straight line, so the child can see that their height is the distance between the top of their head and the bottom of their feet lying down or standing up.

Cut pieces of string (or paper strips) the same length as the child's reach (finger tip to finger tip with arms outstretched) and compare - are they the same? Compare this to head circumference. Find strips to match other body parts such as length of feet or waist.

How many of your own feet tall are you?

(With several children, focus on comparing the numbers and lengths of things used to measure, but not children's heights, as no-one likes being the shortest!)

Measure heights with a measuring tape and discuss the fact that there are 100 centimetres in a metre, and whether the child is more or less than a metre.

Resources

Rolled up sheets of newspapers (secured with a piece of sellotape), pens, Lego bricks, spoons, buttons, coins or anything of roughly uniform length.



Download a [pdf](#) of this resource

Acknowledgement: Penny Latham



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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:

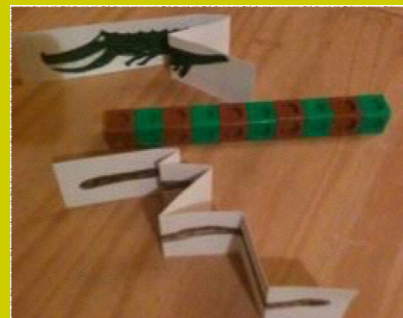
- comparing the shapes and sizes of all the creatures that they make, in particular describing relative lengths i.e. comparing their creature's length before and after extension and/or comparing the length of their creature with another child's

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.



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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.

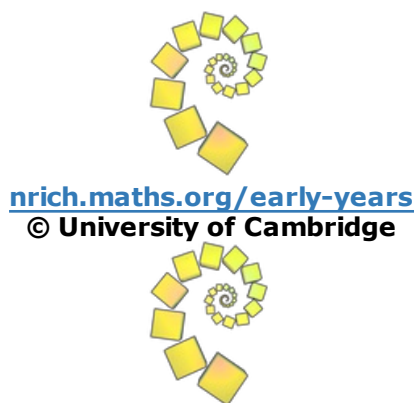


Resources

- 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>



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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

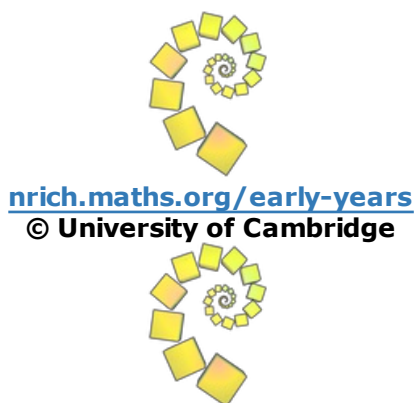
Any story which might involve presents would be a great context in which to explore this activity, for example wedding presents in Cinderella.

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

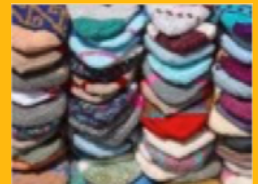


Resources

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

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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



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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

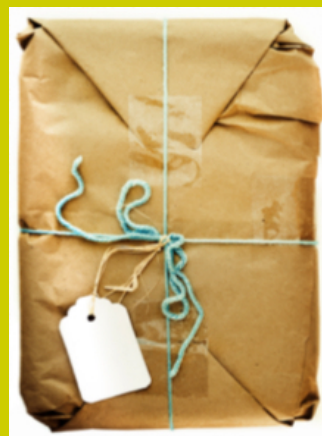
Suggest a birthday party for a toy such as a teddy. What might Teddy like? Offer different-sized boxes and gifts and let the children choose one to put in a box and wrap up.

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)

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