Metropolitan
Borough of Wirral

Active Maths

Some Activities for the Kinaesthetic Learner in Primary Education

Education & Cultural
Services Department

Beacon Council

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Community Legal Services
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Transforming Secondary Education
Child & Adolescent Mental Health Services

JDJY8

Introduction

This booklet has been produced by a group of Wirral teachers who are interested in developing their teaching to take into account different learning styles. The focus on kinaesthetic activities developed naturally as it was generally felt that this was perhaps the approach least catered for in existing plans.

After initial discussions it was agreed that there would be examples of mental and oral starters and main activities as well as some suggestions for resources and ideas for playground markings. The ideas for the main part of the lesson cover number, shape and space, measures and handling data.

It is hoped that having sampled the ideas that teachers would then begin to develop similar ideas for other topics.

We acknowledge that for some teachers these approaches will be embedded in their existing practice.

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Kinaesthetic Mental and Oral Starters

Many of the ideas suggested below can be used, modified and/or adapted for other year groups. We suggest that you read through them all.

Foundation Stage

- Give the children numbers on large pieces of card and ask them to line up in order.

- Children search for missing numbers/shapes around the room.

- Counting songs with actions e.g. Five Little Speckled Frogs, Ten Fat Sausages Sizzling in the Pan.

- Use the parachute. The children stand around the parachute holding it up. Give the children numbers to 10.
  Teacher says things like run round the outside if :-

  You are 1 less than 7
  You are 2 more than 4
  You make ten when added to 7 etc

Key Stage One

- In pair “make 10”.
  1st child choose a number less than ten and jumps that number. The partner must jump the appropriate number to “make 10”.
  (extension “Make 20”.)

- Flashing Hands
  Children flash both hands open ad closed as they count in 10s, one hand for fives.

- Use 100 square on playground.
  Ask pupils to stand on an even number, a multiple of 10, etc.

- Count and clap on even numbers, add numbers, multiples of 5, 10 etc.

- In pairs / trios children are given sets of cards to order.
  0 to 9, 10 to 19, 20 to 29 etc. putting smallest on the top of the pile.
  Each group then “adds their line” as a 100 square is built.

- Counting songs with actions.

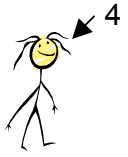
- Walk around imaginary shapes in playground / hall (during P.E. as will) e.g. circle, square, triangle.

- A mental / oral starter (which children really enjoy) in hall or on playground.

Recall no. bonds to 10 – low.
Recall no. bonds to 20 – middle.
Recall no. bonds to 100 – more able.

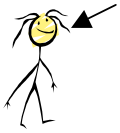
Children work in pairs and make the appropriate number of jumps.

Low



Then partner jumps 6 times

Middle

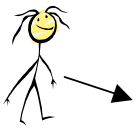


Partner jumps 8 times

More Able

- Each jump is worth 10

Partner jumps x 6



Extension – 1 Jump = 10 .
1 hop= 1
Make 30, 50, 27 etc.
Children “mime “ numbers for each other e.g 3 jumps and 2 hops represents 32.

Years 3 and 4

- Hand Jive
  Hand Jive whilst counting in "2's".
  5 actions – 1. open right hand palm up
  2. open left hand palm up
  3. touch left shoulder with right hand
  4. touch right shoulder with left hand
  5. both hands on head.

  Practise to get the rhythm then ask questions such as

  "Where will your hands be when we say 50?"
  "Where will your hands be when we say 38?" etc.

  "Tell me about the numbers you say when you have your left hand on your right shoulder." etc.

- Mark the corners of the hall (playground) with name of shapes (square, triangle, hexagon, circle). Children run around until teacher says stop.
  Teacher gives a clue. e.g. A shape with 3 sides, four right angles etc.
  Children run to the appropriate corner.

- Star Jumps
  Count to 10, 20, 50, 100 etc.
  Children count in ones as they jump saying 1 as they put their arms up, and 2 as they put hands down and so on.
  Ask questions such as where will your hands be when you say 10, 5, etc.
  Extension; count in 2s, 5s, 10s etc.

- Fizz Buzz
  Children count round the class and say fizz on multiples of 3, and buzz on multiples of 5, and fizz buzz on multiples of 3 and 5 (15 etc.)
  This can be adapted for other tables.

- Ordering H.T.U. (Needs hall/playground/large area)
  Each pupil is given a large digit card. In threes pupils make numbers from teacher instructions.
  Make the largest number you can.
  Make the smallest number you can.
  Discuss some of the solutions.
  Why did you put the 2 there?
  Is it always possible to make an even number?

- Given pupils 3 digit numbers on card in groups of five. Ask them to order themselves smallest to largest. Combine with another group to re-order.

- Use Follow Me Cards to make a human chain.

- Obtain tapes of tables and sing with tape.
- Use zigzag generators for Place Value.

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- Multiple Music
  Children jump, tap, clap, click etc. as they count on certain numbers e.g. tap shoulders on multiples of 2, jump on multiples of 5, stamp on multiples of 10 etc. as you count on or back from 0 – 100.

  (Start with counting in twos to 30, 50 etc.
Then combine 2's and 10's. Then do 5's and 10's and so on.)

- **Ordering Numbers**

Human number line (ordering 3 digit numbers)
  Children are given 'post its' with a 3 digit number and they have to work together to order themselves from smallest to largest number.
  Can be differentiated if children work in groups.
Then ask them to describe their position in number line – why they are in a certain position using vocabulary – units, tens, hundreds, digit, larger, smaller etc.

- **Creating and ordering numbers**

On hall floor give groups of pupils large piece of paper to record answers to questions such as:

  How many different numbers can you make with the digits 3, 4 and 7 etc?

  Write down all the questions with the answer 10, 24 etc.

Years 5 and 6

- Ask pupils to use their arms to show different angles – acute, right, obtuse.

- Use the four quarters of the hall to represent a Carroll Diagram and give pupils numbers less than 50.

	even	not even
multiple of 7		
not a multiple of 7		

This idea can be used for both KS1 and KS2.

e.g.

1. red / not red triangle / not a triangle using logic blocks

2 . blue eyes / not blue eyes
fair hair / not fair hair

- Split the children into 3 ability groups. Give each child in each group a card from differentiated sets with metric measures on. Ask them to put themselves in order.

  Bring the groups together adding Group 2 to the Group 1 line and then adding Group 3.

  Group 1 cards – 5cm, 1m, ½m, 10cm, ¼m , ¾ m, 90 cm etc.

  Group 2 cards – 100cm, 0.5m, 0.1m, 0.3m, 0.8m, 0.75m, 0.25m etc.

  Group 3 cards - $^{1}/_{10}$m $^{3}/_{10}$m $^{2}/_{5}$m 0.8m, 50%m 25%m

- Divide children into 4 teams. Attach 4 sheets of paper pinned / bluetacked to wall.
  Teacher calls out a question.
  First member of each team runs to their sheet of paper to write down the answer.
  A point is scored for each correct answer. Add a bonus point for the team member who finishes writing first.

Kinaesthetic Activities for the Main Part of the Daily Mathematics Lesson

Foundation

- Numbers and the number system

Whole class number line on the playground using large laminated numerals. Children line up in number order.

- 1 more than, 1 less than

Number line as above and shouts instructions, i.e. will the number that is one more than 10 jump up and down. This activity is better done in groups, less hanging about.

- Number recognition

Musical numbers – best done in hall during a P.E. session. Large laminated numbers placed on the floor. Children move around room to the music. When the music stops children go to the number the teacher holds up.

- Money coin exchange

Role play shop – children find coins to buy their own fruit and milk. We also visit the shop (Post Office) to buy small items. This is a pre-arranged activity.

- Addition / Subtraction

Bowling number bonds. Small group activity. Place a number of plastic bottles out i.e. 6. One child "bowls" trying to knock some over. Another child records the outcome on a large white board i.e. 3 knocked over and 3 still standing, 3 and 3 makes 6. Children see how many combinations make 6.

- Shape recognition

Find the shape. Shapes hidden around the room. Children work in pairs to find the shape after listening to the instruction / description, i.e. find me a shape with 3 edges / sides and 3 corners. Less able children given a small shape and asked to find one that matches.

Creating a Maths Trail

Identifying and naming 2D shapes/Counting/Data Handling

- Numbers as labels and for counting
- Using numbers in practical contexts – calculations, groupings, one to one correspondence
- Distinguishing shapes, describing properties of shapes
- Following instructions to move forward/back a number of steps, turn right and left
- Comparing non-standard measures talk about the problems of using non-standard measures.
- Ordering by size, smallest to largest, largest to smallest.

Outline:

This activity provides ideas for setting up a mathematics trail in and around the school. An example trail is provided which can be adapted for use in your own school environment. The trail can be very simple, just concentrating on simple shapes. However it easy to adapt this and incorporate a lot of mental maths activities.
For very young children lots of experiential play would be needed, prior to this activity if they are not yet familiar with shape names. Activities such as making shapes, feeling them in a 'feely bag' etc should have preceded this. The trail could be adapted just to incorporate number awareness.

Software/Hardware requirements:

- Maths software for: counting and ordering numbers up to 10; recognising and matching shapes. Easiteach will allow photographs to be imported. However it is just as easy to do this activity using Powerpoint, using the drawing tools.
- Still/digital or video camera with software and or a scanner
- A portable tape recorder and a tape with instructions.

Other Resources:

- An example of a maths trail around a school
- Diagram – school plan, key points on the trail
- Questions for each point plus photograph of each point.

Rationale:

ICT is used in this activity to give directions for the children to guide them around the trail. This means that the need for reading instructions is removed. Also a different medium for giving instruction often encourages the children to listen more closely. Once the tape is recorded it can be reused by any number of groups and it also means that a classroom assistant or parent can accompany the children on the trail.

The use of a still, digital or video camera means that children can record their progress as they complete the trail and take photographs of other objects they might see. These can be inserted into Easiteach (or Powerpoint).Alternatively, pictures could be taken in advance and these could be used in conjunction with the tape recording to direct children around the trail.

Activity

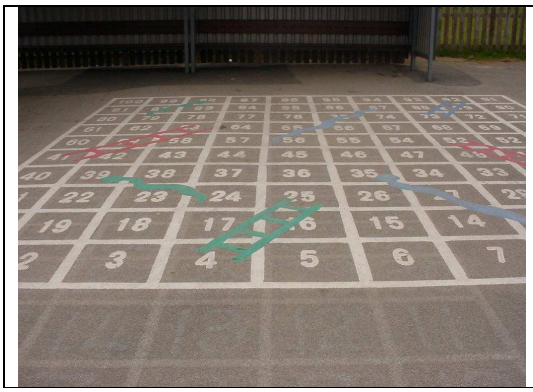
The starting point for this activity involves encouraging children to appreciate that mathematics is all around us.

The teacher asks the children to look around the classroom and find examples of shapes, numbers and measures. The teacher might play an 'I Spy' game for example: 'I spy with my little eye something that is shaped like a circle…' The children will look around the classroom and put up their hand when they have found an example of a circle. The teacher asks children in turn to give the example they have found. Trina might say, 'The clock on the wall.' Faisal might say, 'The top of the waste paper bin.' The teacher then gives other examples including numbers, shape and measures.

The teacher explains to the children that they are going to walk around the school looking for numbers, shapes and measures following the instructions on the tape recorder. The trail might be followed by the whole class or by smaller groups accompanied by a classroom assistant and/or parent helper.

Activities:

The types of questions you can put into your trail will depend on what facilities you have in your own school or school grounds. These are some examples of what your trail might include:

	• Go to the 100 grid. What sort of shapes can you see • Extension: Start at number 1 and hop through the grid counting the numbers as you hop. Do it again, and hop on every other square. • Say the numbers out loud as you hop.

- Go to the number snake. Stand on number 1, walk on 3 squares. Which number are you standing on? Step back one square. Which number are you on now?

	
• Stand at the front/back or side of the school. Look at the windows/doors. What shapes can you see?	• How many squares can you count in the window? door?

	
• Look at the bricks on the wall. Are they all the same shape?	• What shapes can you see in the brick patterns?

	• How many rows of bricks are there in the small wall? • Can you find any patterns in the wall? • Are the patterns repeated on the wall or steps?

	• How many children will it take to reach all the way around the old tree (or sandpit)? How can we check? • Would the answer be the same if we asked Year 6 pupils to try? Why?

- Go to the playground bench. How many children do you think we can sit on the bench? Check if you are right.
- As you go around the trail you will collect numbers. Bring them safely back to the classroom and put them in order – smallest first/largest first.
- Go to the play shop. Choose five different packets from the shelves. Sort them by size – smallest first/largest first.

- Extension
- Look at the shape on the wall in the entrance. How many sides does it have? How many corners? What is it called?

- Can you stand in order with the smallest child at the front of the group and the tallest at the back?

?

- Look at the cars in the car park. How many cars can you count?
- How many are red/blue/silver etc? Use unifix cubes to build a graph of the different coloured cars backing the classroom.
- Look at the number plates. Can you find all the numbers from 0 to 9? If not, which ones are missing?

- Look at the radiator cover in the classroom. What shapes can you see. How many are there.
- Extension: How many points does the star have? How many straight sides etc?

- Now turn left. How many colours are there in the Rainbow? Do you know what this shape is?
- There are less than 7 colours in our rainbow. How many are missing?

- Walk along the corridor. What number is on the first/second/third door you come to?

- What other round/square/triangular shapes can you find as you look around the school?

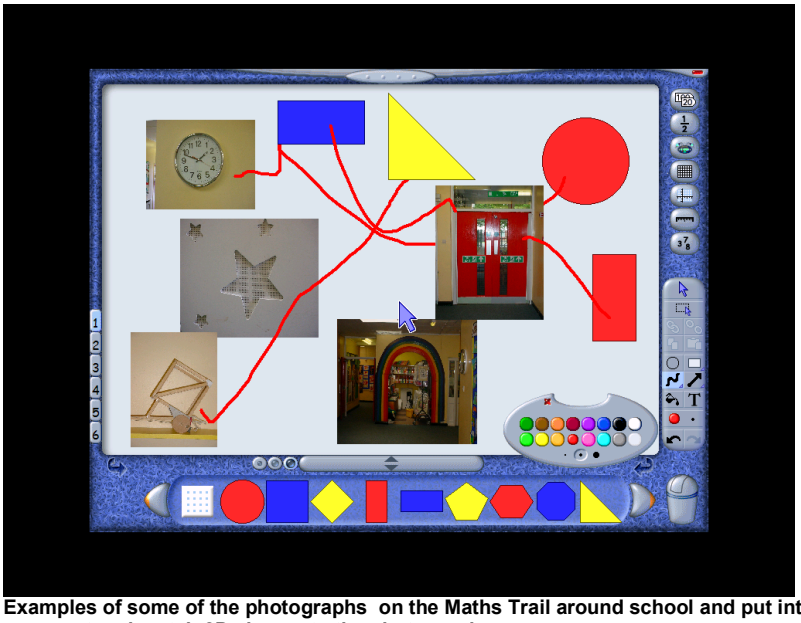
Assessment:

Key questions will depend on the maths trail you devise. Some examples have been given above.

As the children follow the trail, the accompanying adult should ensure that all children are given the opportunity to count, measure or answer the questions. This can be facilitated by letting the children take turns to do the activity where this is appropriate and encouraging the rest of the group to count for them. An adult should record the colour of the cars in the car park.

Children can take digital pictures at each point on the trail and these can then be uploaded to the computer when they return to the classroom. Pairs of children can then take turns to label/caption the photographs using a prepared word bank.

Use the Easiteach Maths program to import the pictures, and using a Smartboard get the children to match shapes they have seen/found on their trail to actual 2D or 3D shapes found.



Examples of some of the photographs on the Maths Trail around school and put into Easiteach. The children then come out and match 2D shapes to the photographs.

Key ICT Skills:

- Operate a still/digital/video camera
- Use a mouse to select and move numbers/shapes on the screen
- Label pictures by choosing words from a word bank.

Web links:
http://www.naturegrid.org.uk/infant/index.htmlLook in the Big Books section and read The Lost Cygnet (a number based trail). Use any of the other books as a starting point for a nature trail around the school.

Number Year 1

Objectives:

- Within the range 0 – 30 say a number that is 1 more / less or 10 more / less.

Main Activity

Resources large number cards 0 – 31

On the hall or playground have number stations positioned around the area. Children line up in groups. Hold up a large number card and first person in the line runs, hops, skips to the station which is either 1 more/less, 10 more/less as asked for by the teacher.

Plenary

Stand in a circle. One person stands in middle and throws round a beanbag and says what is 1 more/less, 10 more/less than…

i.e. teacher in middle says 5, throws the bean bag and the recipient has to say 4 if the rule is 1 less, 15 if the rule is 10 more etc.
(The rules should be repeated 10 times at least before changing to a new rule.)

Measures Year 1

Objectives

- To compare two then more lengths using direct comparisons.

Main Activity

Using story Where's My Teddy, children bring in a teddy to school. Taking their teddies into the hall in small groups they can order them in size fro smallest to largest.

Plenary

Children move around the hall in their small groups on the shake of the tambourine children put their teddies in order according to height.

Shape and Space Year 1

Objectives

- To make and describe models using construction kits.

Activity

Children sit in pairs back to back. Using construction kits, one child makes a model then describes it to their partner who then has to follow their instructions to make a replica model.

Plenary

Using individual large whiteboards describe a picture that you are drawing and children copy on their whiteboard. Reveal your drawing and children check how similar their drawing is to yours.

Handling Data Year 1

Objective

- Solve a problem by sorting information using objects or pictures.

Activity

Through science topic Humans, discuss what we would like to find out about children in your class, e.g. Which is the most common eye colour in class 3? Going out into the playground or in the hall arrange children into a human graph. Children with blue eyes sit in line together, brown eyes the same, green etc. Results can be then collected into a table. Children can colour an eye the same colour as their own then fix onto a large building brick. The bricks can be stacked to form a pictogram.

Plenary

Using the large building brick pictogram, ask children questions about the information that has been collected.

How many more blue eyes than brown?
How many children altogether?

Some General ideas for Year 1

- Encourage children to contribute by writing on the whiteboard.
- Be part of any demonstration – explanation (using hands – 5's explaining odd / even numbers with a partner).
- Moving to different areas in the room for different activities – sitting in a group to begin / move to make a circle / stand around a table to demonstrate.
- Wearing bibs for number lines, children move to correct positions – number order / sentences.
- Hand / body movements in number rhymes.

Number

Activities

1 Objective – to order numbers to 20

Task – children can chalk out a number track on the playground.

2 Objective – know by heart all pairs of numbers with a total of 10.

Task – Children in small teams. When signal to start is shown first child from each team runs round hall to find 2 numbers which make 10. They then run back to their team and tag the next child to go off and find a different pair of numbers that total 10. When the team have got all the pairs of numbers the children sit down in their team. Or you can shout stop when the time is up.

3 Objective – within range 0–30 say a number that is 1 more/less or 10 more/less

Task – Have number stations around the hall or playground. Hold up a number card then say go to the number that is 1 more/less or 10 more/less. Children then hop, skip, jump to the right number station.

4 Objective – say a number that lies between 2 numbers

Task – Ask the question what number/s lie between 10 and 14, throw the beanbag to a child they answer the question then throw it back to the teacher.

5 Objective – Lots of different ones

Task – TARGET – children try to count to a specific target say in 2's to 20 you don't count round in a circle, they can say the next number whenever but only one child is allowed to say it. Takes a bit of practice but they really enjoy it!!

Handling Data

HUMAN GRAPH – once data has been collected about children's favourite food, TV programme or toy etc, the children go out into the playground to make a human graph, each child stands in the column which they chose as their favourite thing therefore making a human graph.

Shape and Space

In P.E. children can individually or in pairs make a shape. In small groups using large strips of paper or skipping ropes children make different 2D shapes.

Make 2D and 3D shapes out of plasticine.

Using Logi blocks children in the role-play area decide on criteria i.e. big and red. Then to get into the role-play area children must choose a shape with those properties. If they choose a shape, which isn't big and red, then they won't be allowed in and they must choose another shape.

Draw a rack / route around the playground. Then they must describe to a partner how to follow the track.

Measures

How many jumps/hops can you do while the sand runs through the timer.

Year Two
Shape and Space

Introductory Activity
Give each child an instrument, each child can make an instrumental sound when the teacher holds up a 2D shape and makes a correct statement about it. E.g. hold up a triangle: “This shape has curved sides”… silence “This shape has three corners”… all play instrument.

Main Activity

Objectives
To use mathematical vocabulary related to 2D shape.
To describe features of 2D shape.

Resources: PE Mats, hall space, Class set of Logi blocks. Labels for PE mats

Introduce to children to features of Logiblocks, e.g number of sides, similar shapes, large or small, thick or thin.
Spread out all Logiblocks on hall floor. Set out 4/5 PE mats, each labelled with an attribute e.g 4 sided or more, thick.
On teacher’s instruction all children collect a Logiblock and run to appropriate mat.
Repeat by changing criteria on mats.
Choose various children to describe their criteria.

Plenary

Teacher sorts several shapes into a set hoop, children have to guess the criteria for sorting.

Year Two: Measure

Objectives
To use and begin to read the vocabulary related to length, mass and capacity.
To estimate, measure and compare length, masses and capacities using standard measure.
To draw and measure lines to the nearest metre.

Resources: laminated vocabulary cards, trundle wheels or metre sticks, tape measures, string. Rolls of wallpaper lining joined together to make a 5m or larger square. Paint and brushes.

Introductory Activity

With a set of laminated vocabulary cards labelled with the following:
Millilitres, millipedes, millions,
Grams, grains, grannies,
Litres, limes,
Kilograms, kilometres, kilt

All the children stand up, tell the children you want to weigh some potatoes, what unit of measure will be used? Repeat : What unit of measure to weigh a handful of salt? A bucket of water? The distance between the school and the local town centre? Hold up various vocabulary cards, when the correct word is held up the children sit down.

Main Activity
The children will be familiar with the work of Mondrian.
Tell the children will prepare a large canvas with black line in the style of Mondrian. Ask for suggestions how the lines could drawn, what measuring device would be used? Experiment with a range of rulers, metre sticks, roll trundle wheel in black paint.
What would be the length of the longest line that could be drawn on the paper? How can they check? Measure and draw a set of intersecting lines, discuss properties of shape. Prepare the canvas ready to be filled with blocks of colour.

Plenary

Take a loaded paint brush for a walk along a piece of paper to form a curved line. Which measuring device will be used to measure the length? Predict length, then measure.

Year Two Number

Objective:
To say number names in order to 100.
To know all pairs of numbers with a total of 20.
To solve mathematical problems or puzzles, recognise simple patterns and relationships.

Resources: 10 red, 10 blue PE bands. 2 PE mats

Introductory activity:
Play naughty numbers: Set the naughty numbers e.g a multiple of 5 or 10,
Children stand in a circle , individuals count on in ones from an appropriate starting number, sit down if the number is a multiple of 5 or 10. Repeat and change the naughty number.

Main Activity:
Give 10 children 10 red bands to wear and 10 children 10 blue bands to wear.
The children are to be sorted into two sets. Record some of the different ways the children could be sorted. Discuss how to check the results.

e.g. (10 red , 3 blue) and (7 blue),

(5 red, 5 blue) and (5 red, 5 blue) etc.

Plenary:

Children listen while teacher counts a number of beans or objects (1-19) into a tin, how many more must be added to make 20?
There are 20 beans in a tin, some are taken out and held in the teacher's hand, eight are left in the tin, how many in the teacher's hand?

This is easily differentiated for year 1 with numbers to 10.

Year Two
Data Handling

Objectives: To solve a given problem by sorting, classifying and organising information in simple ways.

Resources: 4 or more pieces of contrasting types of music, or different genres of music or artists that the children may or may not be familiar with a visual symbol to represent each piece e.g. a soldier to represent marching music.

Introductory Activity:
People sort: Ask children to stand together. Ask people with brown hair to form a group, draw a chalk circle around them. Ask people with a sister to form another group, draw circle. Discuss what to do with people who have a sister and brown hair. (if any) Bring all the children together again, discuss other ways to sort.

Main Activity:
Pose a question: The Headteacher wants to know which fruit to buy for the children at break time. Discuss which fruits could be bought. How can the children find out which are the most popular?
Order children into a human block graph according to favourite. Discuss findings. Can be extended by children designing own data collection sheets or questionnaires and recording findings.

Plenary:

Discuss and interpret findings to present to HT.

YEAR 3
NUMBER Division

Introductory activity
- Use knowledge of doubles and halves to divide
- Recognise odd and even numbers

Will answer be odd or even? Teacher gives division question (with no remainder) and children pull "odd" face if the answer is odd or hold arms out flat if even.

Main activity

Objectives

- Understand the operation of division and the associated vocabulary
- Understand the idea of a remainder
- Make sensible decisions about rounding up or down after division
- Check division with inverse operation

Resources - Large whiteboard and pens
P.E. mats

With whole class in hall ask children to get into 2 groups (ask one child to stand by whiteboard to record answers if there is an odd number of children). Child records number sentence on whiteboard e.g. $26 \div 2 = 13$ and then related multiplication fact.
Repeat for other groupings that divide equally and record number facts on board.
Introduce groupings that leave a remainder and show how to record.
Give examples in the form of word problems that require children to round up or down
e.g. If 5 children are allowed per mat, how many mats will we need?
How many teams of 4 can I make?
Record in number sentence for each example.

Plenary

Will answer have a remainder ? Teacher gives division question and children stand up if there is a remainder, sit down if not.

MEASURES Year 3 Mass

Objectives

- Read and begin to write vocabulary of mass
- Measure and compare using standard units
- Begin to know relationships between standard metric units

Main activity

Resources
cards with weights recorded in g and kg
P.E. benches (optional)
selection of objects up to approx. 1kg
scales

In the hall line children up in teams (standing on benches). The task is to put objects given to each group in order of mass by comparing the relative weight of the objects with the person standing next to you. as quickly as possible. When in order team sits down. The first team to complete the task correctly wins. Check order of winning team's objects with scales. Repeat with a mixture of objects and cards, or with cards with mass recorded in variety of ways.

Plenary

Assign 3 areas to hall or draw 3 circles on floor and label each:-

a)< ½ kg, b) between ½ and 1 kg, c) >kg

Show objects and ask children to go to correct area.
Give oral or written examples of items and repeat.

SHAPE AND SPACE Year 3 Angle

Objectives

- Describe movements and understand angle as a measure of turn
- Recognise and use the four compass points

Introductory activity

Walk around a route turning clockwise and anti-clockwise to revise terms.

Main activity

Mark **N S E W** on the walls of hall or classroom.
Ask children to stand up and face North.
Give instructions e.g. turn one right angle clockwise. (The children could be encouraged to partake with their eyes closed.) Children call out compass point as they turn to face it. Change starting direction.
Give instructions e.g. take 4 paces east and turn 2 right angles clockwise.
Discuss effect of turning 2 right angles.
In 2's, ask children to give directions to their partner to reach a given point using correct vocabulary.

Extension or adaptation for year 4:-

Use 8 compass points, instructions to include ½ right angle turns, ¼ right angle turns, 1 ½ right angles etc.

Plenary

Repeat main part activity giving instructions e.g. turn one right angle clockwise. Children to call out compass point as they turn to face it, but remove one or more compass point labels during game.

HANDLING DATA Year 3

Objective

- Solve a problem by organising data in Venn diagrams.

Introductory activity

Draw a circle on the floor and ask children to go into it if they fit certain criteria e.g. children who are 8. Ask questions e.g. how many children are not 8 etc.

Main activity

Resources - selection of flat shapes in different colours
number cards 1 - 100
large labels for sets (e.g. colours and shape names, odds and evens, multiples of 5 etc)

Draw an additional circle and introduce idea of two overlapping sets.
Ask each child to choose a shape and then label sets. Ask children in turn to go to relevant section.
Repeat with different criteria, e.g.
(i) fair hair/blue eyes,
(ii) can ride a bike/can swim.

Remove labels. Send some children to stand with their shapes in specific sections and ask remaining children to decide where they belong.
Repeat activity using number cards.

Plenary

Play “Spot the mistake”. Send some children to given sections and ask children to identify child in wrong place.

Mind Friendly Maths Group – Year 4

Number Year 4 Place Value

Objectives

1. To read and write whole numbers and know what each digit represents.
2. To add or subtract 1, 10, 100, or 1000 to/from any integer

Main Activities

Resources

Set of large digits

Give 4 children a large size digit each, ask the class to read the number and to identify the value of each digit.

Ask the children to rearrange themselves to make the largest/smallest number. (Largest odd/smallest even etc). Rest of class explain how they did this. Get the class to count on and back in 1's. changing the units digit. Ask the children to explain what is happening. Repeat with adding multiples of 10, 100, and 1000.

Plenary

Give children digits including a zero, ask the class to read the numbers made.

Discuss how a zero changes the rules for making the smallest number.

Measure Year 4 Perimeter

Objectives

1. Measure and calculate the perimeter and area of rectangles and other simple shapes.

Main Activity

Resources

Squares and rectangles marked out
Strips of paper
String in perimeter lengths
Square metre sheets of paper

On the playground or carpet tiles draw large squares or rectangles with chalk. Children walk round the perimeter.

Make strips of paper a metre long and hold them round the edge to measure.

Have several pieces of string the same length as the perimeter and use to make other shapes.

Make a square metre by taping together 4 metre sticks or on paper and use to measure the area. Investigate whether shapes with the same perimeter have the same area.

Plenary

In pairs the children explain to each other what they have learned about perimeter and area and how they learnt.

Shape and Space **Year 4** **Position and Direction**

Objectives

Make and measure clockwise and anti-clockwise turns
Recognise positions and directions
Recognise simple examples of horizontal and vertical lines
Use eight compass directions

Main Activity

Resources

Compass points on wall
Grid marked out
String
Worksheet for plenary

Compass points
Label classroom walls with the compass points N, S, E and W .
Children face one direction and turn using instructions – 90 clockwise, 45 anticlockwise etc.

Co-ordinates
Mark out grids in the playground or on the classroom floor. Stand on co-ordinates given. Move through compass directions and give new co-ordinates. Selected children follow co-ordinates and stand on the grid, fourth child works out where to stand to make a rectangle, use string to check the shape. The shape can then be translated and the new co-ordinates worked out. Repeat with other shapes.

Plenary

In pairs the children are given a grid with 3 co-ordinates that would make a right angle triangle if joined. They explain to each other what the shape is and where to put a 4^{th} co-ordinate to make another shape and how they know what shape that would be.

Handling Data **Year 4** **Venn and Carroll Diagrams**

Objectives

1. Solve problems by collecting organizing, representing and interpreting data in Venn and Carroll diagrams.

Main Activity

Resources

Venn diagram or 2 PE hoops, labelled
Set o capital letters
Carroll diagram drawn and labelled
Whiteboards

Draw large Venn diagram, using 2 circles labelled straight sides and curved sides. Give each child a capital letter and they place these in the appropriate place.

In pairs generate questions based on the diagram. Share the questions with the group or the class.

Draw a large Carroll diagram labelled brothers, no brother, sisters and no sisters. Ask the children to stand in the appropriate place.

Work with the people standing in their section to generate an appropriate question for the rest of the class to answer.

Plenary

On whiteboards list the similarities and differences between Venn and Carroll diagrams. Share with a partner and then with a group.

Year Five

Ref: Year 5 Autumn Term Unit 8 Shape and space Day One (open space required)

Oral and Mental

Objective- To describe 2D shapes and their properties.

Children are divided into teams of 8 and given a reel of string per team to work with. The groups are to create shapes with specific properties, as directed by the teacher, using the string as sides and the children as vertices. For example, "Can you create a shape with four right-angled corners and opposite sides the same length?" "An irregular heptagon?", and so on. More able children are to create quadrilaterals, using criteria such as parallel sides, equal angles, and equal sides etc.

(It may be easier to differentiate if the properties of shapes are written on cards for each group).

Two teams can them be combined so that one team can create a triangle of their own choice, while the other team try to recognise its name and properties using criteria such as equal sides/angles and lines of symmetry.

Teaching Activities

Objectives – To recognise the properties of rectangles
To understand the term bisect

Select one of the teams of 8 to create an accurate square with assistance/direction from the rest of the class. Whilst children are directing the group, draw out the properties of a square – "What can you tell me about a square…the sides…the angles…symmetry?" etc. Pass the pen race – collect as many of these properties as possible on a flip chart.

Invite children to use the string to connect vertices together that are not joined (diagonals). Children to brainstorm in their groups how they would define such a line – draw out 'line from a vertex of a polygon to a non-adjacent vertex.'

Establish that such lines are known as diagonals and invite team members to measure them. Question children as to what would be the measurement of half this diagonal. Explain that when lines cut each other exactly in half we say they bisect each other.

Children to rejoin their teams to repeat the whole class activity with a different – sized square.

Group work

Children to investigate in their teams the question – ‘Do diagonals of all rectangles bisect each other?’

MORE ABLE – Teacher focus - creating quadrilaterals with specific properties i.e. parallel sides etc and classifying them.

Plenary

Children to feed back on investigation – what did they find out about the diagonals of rectangles?

Ref: Year 5 Autumn Term Unit 9 – Measures Day One

Oral and Mental

Objective– To multiply and divide whole numbers up to 10 000 by 10 or 100.

Columns labelled on chairs at front of class: TH, H, T, U, . , t, h, th. Children placed in front of chairs as 'human digits'. Teacher calls out the number they are representing and the children in front of chairs then have to write down their individual digit on a wipe board. Rest of class can also be noting down number on their wipe boards. The number is then multiplied or divided by 10/100 and the 'human digits' physically jump the required number of columns. Rest of class can either jump with them or write down what they predict new number to be. Extend more able with decimals and x/÷ by 10/100/1000.

Teaching Activities

Objective – To convert larger to smaller units of length.

Pass the pen race. Two teams race up to flip chart to record as many units of measurement as they can for their team. Establish winning team and then invite children to come up and highlight any units of measurement of length. Children at tables write down a different one each on their wipe boards and then on teacher's command order themselves from longest to shortest.

After quick look at OHT 9.1 and reminder of how we convert, children are given a card to hold i.e. 25 millimetres and have to locate their 'buddy' i.e. 2.5 centimetres (the corresponding conversion) Cards can be matched to children's ability.

Display 2 lots of OHT 9.2 and back in original 2 teams children pass the pen and race up to fill in the missing conversions. Measurements can be changed according to ability.

Group work

Children play 'matching pairs' game similar to Resource Sheet 9.1 according to ability. More able required to calculate more challenging conversions.

Plenary

Repeat game where children locate their conversion 'buddy' and select children to explain how they made their conversion. Discuss methods ensuring that children can convert between metric units of length.

Ref: Year 5 Autumn Term Unit 3 – Multiplication and division 2 Lesson One

Oral and Mental

Objective – To derive quickly division facts corresponding to tables up to 10 x 10

'Army style' marching and chanting around the playground, which is teacher led to begin with. Teacher calls out division calculation with either correct or incorrect answer. Children repeat correcting answer if required. Children are then split into smaller groups. One child selected to be sergeant and repeat previous teacher led activity. In same group, children get into a circle with one child selected to be the leader in the centre. Centre child calls out a division question e.g. 'How many 3s make 24?' and throws beanbag towards a child who has to try and answer before catching. Rest of group also calculate answer and give thumbs up or down as to whether 'catcher' was correct. Extension group to be working with decimals.

Teaching Activities

Objective – Use informal pencil and paper methods to divide.

Children, in same groups as oral mental, are give jumbo chalk to work with on playground surface. A problem is presented: 78 children need to be placed in teams of 6. How many teams will there be? Children are asked to solve the problem using any type of informal or formal way of recording. Children to feedback on jottings they have made using chalk and explain methods.

A second problem is presented and the children chunk on the empty number line to calculate the answer. They use wipe boards, chalk and skipping ropes for jumps. Feedback is taken from children and then using one group's equipment the teacher demonstrates how to transfer the number line method to a more formal written method by moving wipe boards and placing them in vertical layout.

Group Work

Cards with word problems written on are placed in a bucket. Children take lucky dips, solve problem using written methods on playground surface and then check that they are correct using calculator.

Plenary

Back in class play game of beetle drive using the 8x table. Children need one dice numbered 1-6 and one numbered 7-12. On flip chart, each part of the beetle is allocated a number. The number being a multiple of 8. Children take it in turns to roll either of the dice, multiply the roll by 8 and then gain certain part of their beetle. Winner is the child to have drawn a complete beetle. They must stand up and shout 'beetle'. The game can be differentiated according to ability and made more

challenging by enforcing rules like 'you must get a body for your beetle to be able to start' etc.

Ref: Year 5 Autumn Term Unit 6b – Handling data 2 Day One

Oral and Mental

Objective – To order a set of fractions.

Groups of children given a set of fraction cards and a skipping rope. On teacher's signal, children have select a card each, and order themselves along their number line (skipping rope). Feedback taken and questions targeted. More able could have a mixture of fractions and decimal equivalents to simple fractions e.g. 0.75.

Teaching Activities

Objective – To solve a problem by representing and interpreting data and tables

In hall, children to record on a wipe board two numbers from 1 to 5 and one number from 6 to 10. Discuss ways of recording the numbers chosen by the class and then explain that the children are to represent the information using a bar graph. Show OHT 6b.1 and discuss labels for axes. Ask children about whether the most common number will be less than 5 or greater then 5. Discuss reasons why. Children are split into groups of 10 and use chalk and metre sticks to complete a giant bar chart to represent their group's information. They can either draw bars, or work against a wall and become 'human bars'.

Plenary

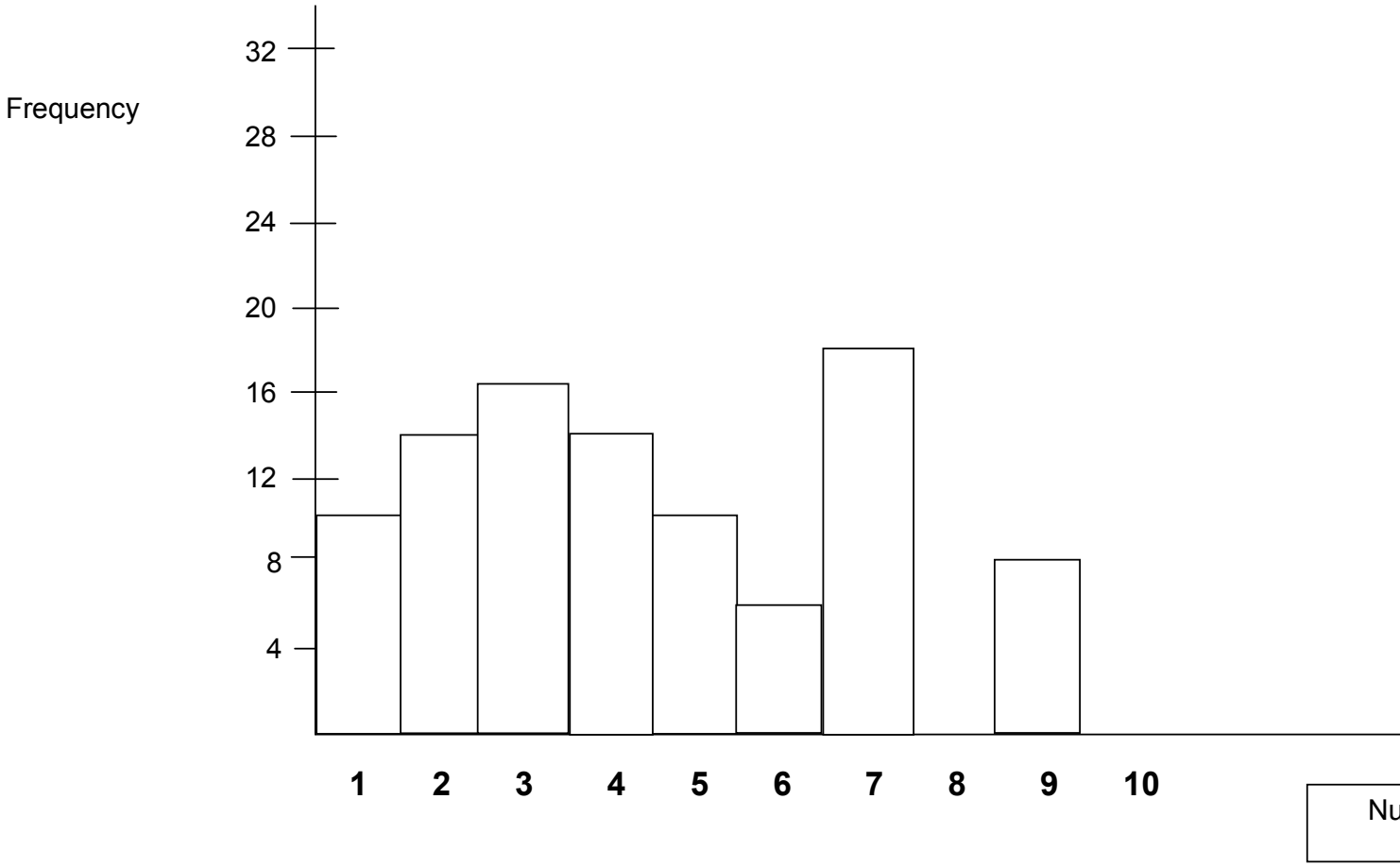
Examine each group's bar graph and children are to create questions to ask about each other's data.

5 mile	=	*8 km*
1 mile	=	1.6 km
1 kilometre	=	1000 metres
1 metre	=	100 centimetres 1000 millimetres
1 centimetre	=	10 millimetres
1 kilometre	=	1 000 000 millimetres

1.5 km	=	1500 metres
2.6 km	=	_____metres
5.2 m	=	_____cm
_____ m	=	240cm
10.5 cm	=	_____mm
_____ cm	=	152mm
3 km	=	_____ mm

Unit 6b Year 5 (Autumn Term)

Bar Graph to show the numbers selected



General Ideas Year 5

1. Mental warm up → tables. (Hall or playground)

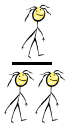
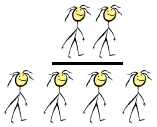
   Group pupils. Count to 40 together. Each group jump on multiples of an allocated table.
   3x, 4x, 6x, 8x – lower ability (2, 3, 5).

2. Mental warm up → decimals & fractions.
   A2 cards with tenths and hundredths on and the equivalent fractions. Pupils have to sort themselves into a number line with decimals on. Differentiate by one group working on ordering decimals, one fractions, one fractions and decimals.

   Then pupils have to go up with the equivalent fraction to the decimal I call out.

   ½ = 0.5
   $^1/_{10}$ = 0.1

1. Go into the hall, pupils bodies make the fraction

$\frac{1}{2}$  =  $\frac{2}{4}$

   Ask pupils to make the equivalent faction in bodies for quarters, sixths.
   What are they doing?
   Multiplying the numerator & denominator by the same number, put x 5 card by = sign. Pupils make the equivalent fraction in bodies.

   Change the initial fraction ¼ or $^1/_3$. How do the bodies alter.

   Take this further by doing it with ratio.

YEAR 6 NUMBER

SWAPPING PLACES

OBJECTIVE:

To solve a mathematical problem by measuring.

STARTER:

Shuffle three sets of 0-9 cards and deal three cards. Use this to make a 3 digit number with 2 decimal places (e.g. 3 7 6 could make 7.36). Write the decimal number on whiteboard for all to see. "What do we need to add to this to make the next whole number?" Insist on correct language – nought point six four or sixty four tenths.

In groups – one child has to run out to put cards on whiteboard or write it. Make it a competition. Who is there first?

Differentiation:
One decimal place. What do we need to get to next whole number?
Use only whole numbers. What do we need to get to the next hundred?

MAIN ACTIVITY:

Arrange children in a row –alternately those with/without tie [or something different eg. coloured bands]

Children next to each other can swap places.

- How many swaps does it take to have all the children with ties together and all the non-tie children together?

PLENARY:
Children feedback what they have found. Have they noticed a pattern? Could they do it as a pattern/sequence without doing it practically now.

YEAR 6

HANDLING DATA

OBJECTIVE:
To use Venn diagrams to sort info about numbers or shapes.

STARTER:
Cards with 3, 30, 300, 3000, 0.3, 0.03 (enough for all class minus 6)

Need:

- 6 cards; 1 with x10, ÷10, x100, ÷100, x1000, ÷1000
- Circles in playground with:

  3 30 300 3000 0.3 0.03

Six children have x or ÷ card. They chase other children. If caught the child has to do operation e.g. 3 (x100). They stand on the 300 circle with hands out wide, until someone touches them and releases them. The game can be used with all different numbers.

MAIN ACTIVITY:
Have different groups with different shapes and properties.

Use hoops / skipping ropes labelled with properties of 2D shapes.
e.g. 4 right angles, opposite sides equal

Give children a card with a 2D shape. Find the correct place on the Venn diagram made from ropes or hoops.

Use this for various criteria e.g. properties of 3D shapes
prime
even / odd numbers

Challenge: Sort according to three criteria, ensuring that there are intersections.

PLENARY:
Spot the mistake.
Child stands in wrong section. Who can spot the mistake?

YEAR 6

MEASURES

OBJECTIVE:

- To suggest suitable units and measuring equipment to estimate or measure length.
- To use read and write standard metric units (m, cm, mm).
- To identify and use appropriate operations to solve word problems involving numbers and quantities based on real-life time and measures, using one or two steps.

STARTER:

Target the Number (in groups).

You need two sets of 2-10 cards shuffled together, a set of target numbers (0-100).

Player 1 deals out four cards face up in the centre of the table and chooses a target number e.g. 32 (from pack). All. Players use the four numbers and any operations to reach the target number. If 1,2,7 and 8 were dealt then 2 x (7+1+8) could be achieved. Each card used only once.

Differentiation:

Add some larger numbers to 2-10 e.g. 25, 50, 12 etc., or keep target numbers lower.

MAIN ACTIVITY:

Can we find the quickest and safest fire escape route?

- Ask the children to tell you where they should go in the event of a fire and what they should do.
- Tell them that to start with, you are going to investigate times taken to evacuate various locations around school.
- Select a child to use the stopwatch and time how long it takes for each fire drill.
- Discuss ways in which the fire drill could be speeded up (without rushing) e.g. double line or no line.
- Split class into groups to investigate the distances of various exit routes. Choose appropriate measuring equipment – distance / time. Record on sheet.

PLENARY:

Swap routes. Discuss for / against. As a class, discuss best possible route. Why? What were the problems? Could we take any advice to the Headteacher?

YEAR 6- AREA AND PERIMETER

OBJECTIVE:
To prove that shapes with the same area can have a different perimeter.

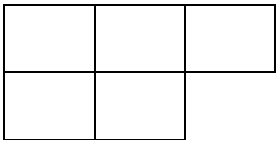
STARTER:
Each child has a piece of paper. Writes down a name of a quadrilateral. Screw it up and throw around room (when told). Each child picks up a screwed up ball, opens it and writes a definition. Screws it up again, throws, opens and writes a new definition. Open at end and with partner discuss each others statements. Discuss as a class the correct definitions.

MAIN ACTIVITY:

- 4 children stand in a square shape with hands outstretched Î 1 m2
- children join the square to make more square metres

5 sq. metre

- count the perimeter 12 metres = 5sq.m
- now find different shapes with 5 sq. m
  what is the perimeter now?
  e.g.



10m = 5 sq. m.

PLENARY:
Draw 3 L-shaped polygons on the board. Explain that each of the hexagons represent a garden fenced all the way round. The total length of fencing is 40m. The 2 longest sides are 10m and 8m. Get the children to discuss what possible lengths the other sides might be for each case. Record these on the board. In pairs get the children to find the area of each garden. Collect responses.
Draw another l-shaped hexagon.

The area is now 70cm2. What can the perimeter be now?
Emphasise that the shapes with the same area can have different perimeters.

Maths Games

Mexican Wave

Fizz Buzz

Stand up or Clap for odd numbers / even numbers etc.

Number Police – number has been stolen. What number is it? Children use toy phone to give clues to police without saying the number. E.g. It is even. It is <20 etc.

Each`Child given a number.
Go and find – find number that goes with yours to make 10. Find a partner and work out your total. Find the answer to your calculation. Find a calculation with the same answer as yours.

Throw beanbag round – in pattern of 2, 10 or say a sum, throw, child says answer.

Giant number line – jump if you are an odd number, if you are one more than 8 etc. Human numbers get yourself in order.

Songs – number bonds song.
0 – 10 two fat men
1 – 9 all in fine
2 – 8 at the gate
3 – 7 gone to Devon
4 – 6 funny tricks
5 – 5 swim and dive
6 – 4 knock at the door
7 – 3 cup of tea
8 – 2 pot of stew
9 – 1 nearly gone
10 – 0 always a hero
Put this to actions.

March around playground chanting pattern of 2 etc.

I am 6 who is 5 + 5 etc..Follow me game in hall or playground. Children join the chain as their number comes up and read their question.

In small groups in hall or playground, join hands. Can you make a square etc?

Number Trail around school. Follow clues to get to certain numbers. At the tree you'll find 2 x 3. Work it out before you get there. Write the answer on your whiteboard. Are you right?

Make shapes using playdoh / plasticine 3D shapes.

Have a sand tray for some children to “write “ their calculation in.

Send a sum / calculation to a partner on an aeroplane. They send it back with an answer on it.

Double number track for bigger / smaller.

Chart CD to say number bonds.

Useful Playground Markings

Hundred Square

Hopscotch

Snake Number Track

Chessboard (for use in work on coordinates, area and perimeter)

Compass Points

Resources for Kinaesthetic Approaches to Teaching and Learning in Mathematics

Zig zag generators	NES Arnold	£8.99 for 20
Large Numbers	HOPE	£39.99
Floor toss Game	HOPE	£33.95
Maths Together (poetry books) ISBN 0 - 7445 – 7219-3	Walker Books.	
Count Me In (44 songs and rhymes about numbers) ISBN 0 – 7136-2622-4	A & C Black	£8.99