



I'm a teacher, get  
me OUTSIDE here!



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Learning Ltd

## Grouping objects

Multiplication is about the repeated addition of objects. In order to understand this, it can be helpful for children to revisit the concept of groups as each new times table is introduced. Remember too, to follow your progression framework or other programme in terms of adjusting the suggestions below. They are not in a sequential teaching order. If you are looking for specific teaching, then NCETM have material:

<https://bit.ly/35NVihP>

### 1. Equal lines and steps

When lining up to go outside, use the opportunity to deliberately create unequal lines, with a small number of the children. Invite the class to make suggestions as to how many more are needed to be added or taken away to make an equal number of children in each line.

When getting outside, if you have steps to walk down discuss in advance if there is an equal number of steps in each flight of stairs. If so how many?

### 2. Exploring Equal and Unequal Groups

- Create or draw three circles on the ground in the centre of the gathering circle. Have a soft toy or puppet help you, if your class responds to this approach.
- Ask the class to turn around so they can't peek. Put equal groups of an item in each circle, e.g. groups of 4 cones.
- Ask your class to have a look. Get them to tell you what your toys have done. Focus on pattern and layout... even though the layout is different, each circle contains the same number.
- Repeat the activity, only this time but put different amounts in each group, e.g. 3, 5 and 5. Discuss what is different. Emphasis that the groups are unequal.
- Repeat this a couple more times if needed – focusing on equal groups.

Next ask children to work in pairs. Hand out a card with a number on it. Avoid ones that cannot be grouped equally.

- Challenge each pair to find this number of items, e.g. If they have number 8, they must find 8 items all the same, e.g. 8 stones or 8 sticks. These need to be brought back to the gathering circle. Give more able children numbers that could involve splitting into three or four groups, e.g. 9, 10 or 12
- Ask each pair to make equal groups out of their objects. For example, this could be two groups of four, or four groups of two. Let your children work this out and choose their groupings.
- Have a show and tell of the equal groups created. If a pair has made an error and created unequal groups, ask the class for advice and support the pair of children to listen and correct their groups.
- Finally one of the soft toys asks if it's possible to make the number 5 into equal groups? What do the children think? Can they show the toy with their objects? Are there other numbers which cannot be grouped equally?

### 3. Adding equal groups

You need:

- A range of items to be collected, e.g. sticks, stones, daisies, etc. If needed, import these into your outdoor space and scatter them about.
- A place to line up objects – if you have tiles or paving, this is good, if you don't then put down number tiles or hoops or similar.
- Give each child or pair, the challenge of collecting a specific number of a specific item, e.g. *I'd like you to find 2 cones and put both on a tile. Let me show you.*
- Once the cones are laid out in pairs, ask your class to estimate how many they think are on the line of tiles.
- Then model how to step along beside the line of tiles counting in twos. Encourage your class to say the words aloud as you do this.
- Once your children have the hang of saying the numbers in time to you walking along the line of tiles and cones, invite a pair of children to try this. Can they walk along in time as the rest of the class count aloud in twos?
- Finally try repeating the above, counting backwards.

#### Extensions

- Create lines of different groups, e.g. 3 sticks on each tile or 5 stones.
- Once your children can count aloud in time, can they invent a movement for each counting group. This is good for keeping warm and involved but is also an additional challenge in its own right, e.g. marching on the spot, jumping, touching the ground.
- Some plants have leaves that naturally come in pairs, trios (clover) or fives (horse chestnut leaves). These make good substitutes.
- If you have chuckies or similar on a path, in pairs, children can grab a handful, estimate how many each of them have before counting. Which lay out enables the most efficient method of counting – is it twos, trios, groups of five or another combination?
- Multiplication stones. For some children it can be very laborious making groups repeatedly. Also, back in the classroom, you may want an approach that takes up less space. One option is to create sets of multiplication stones. These enable children to subitise quantities and make the connection between the numeral 3 and the number of items it represents. For more information, have a look at this blog post: <https://bit.ly/2UJEv9E>

#### Finally

Show your class written representations of what you have done. How would they draw or write about this work? Remember to reinforce that the objects are in equal groups – that every tile has the same number of cones. Show the different examples, e.g.

- There are 10 tiles. Each tile has 2 cones.
- 10 tiles of 2 = 20
- 10 groups of 2 = 20
- 10 2's = 20.
- There are 20 cones altogether.
- 2, 4, 6, 8, 10, 12, 14, 16, 18, 20

Keep reinforcing equal groups and different ways of talking about these back inside

*If you have a walk to get outside...*

Why not put pairs or trios or other groups of objects or pictures along the route for children to count?

## 4. Making Equal Rows

This is a useful step from the *Adding in Equal Groups* activity above into creating arrays.

- Show your children an 6x3 array you have made from cones. Ask them to work out how many cones are in the array. They can discuss this with a partner and feedback ideas.
- Ask each person in your class to find one of the same item, e.g. a cone, and to bring these as quickly as possible to the gathering circle.
- Taking turns, 3 children at a time can come put their cones in the centre of the circle on a white sheet so that they are visible in rows of three. As this happens, encourage everyone to count, e.g. 3 cones in 1 row, 6 cones in 2 rows, 9 cones in 3 rows.
- Once this has happened, place a stick at different points so that the array is broken up, e.g. 9 cones in 3 rows and 21 cones in 7 rows. Refer to them also as 3 threes and 7 threes.
- Split the class into pairs. Give each pair of children some rows to create, e.g. 5 rows of 3 or 2 rows of 5. 6 rows of 2, and so on. Don't make them too big or complex at this stage. Use the edge of the circle as the working space so that. Put a time limit on this. Then number each array.
- Ask everyone to stand by their array. Using clipboards or a digital device, each pair is to move clockwise around the circle looking at each array. For each array they should note down:
  - Number of cones in each row
  - Number of rows
  - How many cones there are altogether
- After everyone has walked around and made a note, share the findings. Allow for discussions and children to amend their work. For example, some children may have calculated the total number of cones in a different way.

## 5. What Comes in Threes

This is an exploration of your outdoor space and is a useful introduction to any times table. Using tablets or iPads capture examples of three objects. Help children define this, for example:

- If you have three litter bins but they are spaced out, then using an app like Pic Collage could be helpful to put them together.
- How creative can your children be? Triangles have three vertices and three edges. Thus, looking for triangles may appeal to some children as part of this challenge.
- A good discussion could also be had about creating sets of three from a larger group. Is this acceptable to your class? It can certainly help find objects when in a barren playground:



*Here are two groups of three dots*

4. You can also extend this to find out what groups occur inside too and in the home. It's about making clear conceptual links to the real world.

5. Be up for having a discussion about collections within collections. In the photo below you will see a window which is an array. Would this count given there are three columns? Also encourage your children to think about multiples. For example if you picked 5 clover plants, how many leaves do you have?

### ***What comes in three's?***



3-leaf clover



duck feet



street lamps



Tricycle



flowers



window

## **6. My Land of Three**

Using a little box or paper plate or wooden board, children create a miniature landscape. However, they may only use three of any item that they find. If it's a windy day, a bit of clay can help secure the landscape.

Your children can then share their creations and use them as springboard to creative writing. If it's poor weather, then going outside to collect groups of three objects to make their own miniature world back inside is possible. Alternatively, create a whole class landscape. If you have a sand tray or a tuff spot then these can make good focus points. This could be further added to by collecting trios of items from home or the classroom.

## **7. Pruning Shrubs and Trees**

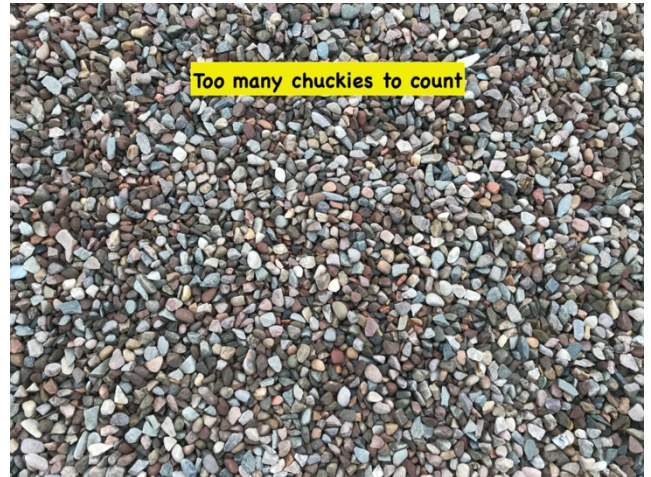
Trees such as willow or hazel can be coppiced or pruned so that new shoots emerge that can be used for a variety of different projects. Pollarding is a similar activity that happens when trees are pruned well above ground level and are commonly found in gardens and urban settings. Each node will produce groups of shoots. Do all the nodes produce watershoots of equal amounts?



## 8. Clumping

There comes a point where there are sometimes too many objects to be counted one-by-one. When this happens, we have to learn the art of clumping. This is a recognised field method of estimating large quantities by estimating groups. It's also very satisfying being able to count in tens and hundreds for a real purpose.

You need to go to a park where there's lots of objects such as twigs or cones (acorns) lying on the ground. Alternatively find a place with a lot of chuckies and a wee bit of space nearby to count them. Failing that, import materials into your school grounds.

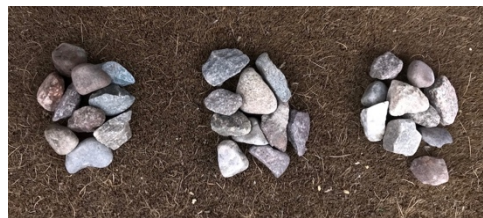


- How many objects can we collect in one minute? If you don't have a timer, then count 60 "elephants", e.g. 1 elephant, 2 elephants, 3 elephants...
- Look at your collection. Together, make an estimate about how many you have collected.
- Discuss the different possible ways of grouping and counting your collection. Which approach is the most efficient? Try counting them in different ways. For example, you could:
  - Count in 2s
  - Put your stones into clumps of ten
  - Put your sticks into tally marks
  - Another idea that you can think of.

*(There may not be a correct answer here. A lot depends on what you are counting, so it's good to try different ways of clumping the objects to count).*



Tallies are used for counting in 5's



These are piles of 10 stones



This layout is handy for counting in 2's

- Next create a collection of 100 objects. Again, think about how you can do this efficiently. You need to get a feel for the size of 100 objects. As you can see it's a bit smaller than one shoe.



Ten clumps of 10 chuckies

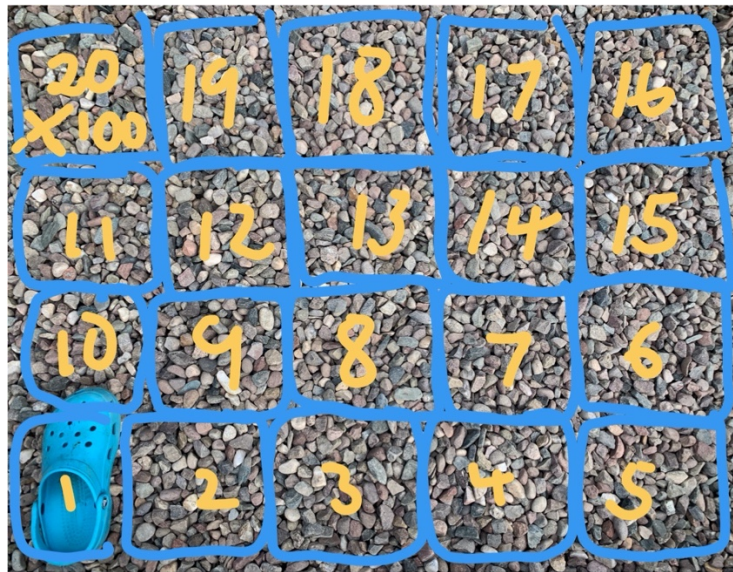


One clump of 100 chuckies



This is the size of 100 chuckies

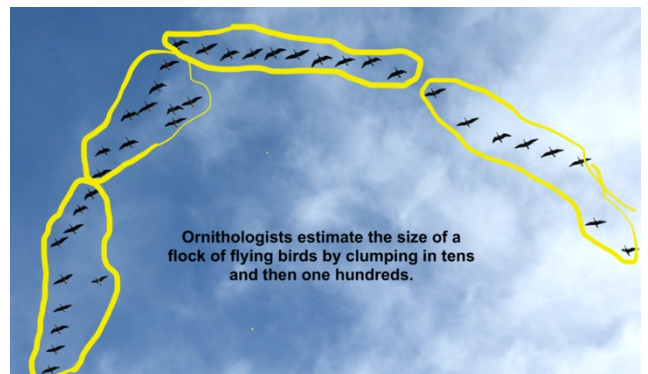
This clump size can now be used to estimate the number of chuckies in a patch. You do this by estimating the size of the 100 clump and counting the number of clumps. In the photo below, there are 20 clumps of 100 chuckies. So the estimate is 2000 chuckies in the patch. Wow!



This technique can be used to estimate large numbers that are too big to count. You count 10 of the objects. Then you count ten of these 10 objects to get your clump of 100. Then you count the area in clumps of 100 keeping to the approximate size.

Try it with other objects outside. Pick something countable. You could use chuckies but other things are a lot more interesting e.g.

- The number of bricks in a wall. A brick layer may do this to estimate out how many bricks they have to use.
- The number of tiles on a roof. A roofer may estimate this when adding tiles to a roof.
- The number of leaves on a tree. A forester may do this to calculate the impact of a disease on a tree.
- The number of trees in a wood. A timber merchant can calculate the value of a woodland based upon the approximate number and age of the trees.
- A flock of birds flying overhead. Ornithologists quickly learn to estimate as many as 5000 geese this way!
- The number of seeds on a dandelion head. It's a very interesting data handling challenge for older children.



This may not be text book maths but it is very useful and a lot of fun, especially if you practice and become accurate in your estimations.

#### *Interesting things to know*

- Chuckies are sold not by number but by their mass – how heavy they are. It's quicker to work out their value this way rather than by counting.
- Trees are also valued by their mass, in tonnes.
- It is said that Thor, one of the Viking gods, was once given a punishment by his father Odin. He was made to count all the stones in Wales. What are your thoughts about this?



## 9. Getting into Groups

This is a useful starting point for many multiplication and division activities as it involves looking at remainders when children move into equal groups. It can also be good to demonstrate the commutative aspect of multiplication, i.e.  $3 \times 8 = 24 = 8 \times 3$

- You can draw circles or put down hoops so that children form the groups by going into a circle. Alternatively, children can be expected to group without this visual prompt.
- Your class runs around. When you shout out a number, e.g. “3”. your children must form groups of three. Then children can work out the sum, e.g. 25 children jumped in 8 hoops and one person was left over.
- The leftover child/ren can either go back in the game or it can be played as a process of elimination with children who are out, collecting hoops and calling out numbers and checking the sums are correct.
- It can be helpful to also put the commands into little stories so that your class get used to hearing the multiplication expressed in different ways.
- Back in the class this activity can be revised using counters, e.g. there’s 24 children in our class, how many different equal groups could be made?

## 10. Mini Multiplication Dances

There are many variations on this theme. One way to extend this into a more physically active and creative approach is to introduce an element of dance. If you think about ceilidh moves, these are in natural groupings such as pairs, trios or larger groups, depending on the dance. For example:

- Military two-step
- Dashing White Sargent that involves trios and doubling to make a group of six
- The Eightsome Reel

When doing a dance approach, it can be helpful for your children to have autonomy over the moves they make. Use numbers that naturally work well together, e.g. 2,3, and 6 or 2, 4 and 8. By working on the sequences and the changes from one form to another, your class can create a mini multiplication performance. Add music and invite another class to watch! For example:

- When asked to form groups of two, each pair then has to skip around the playground together or do a creative series of moves from one place to another, in unison together. Or hold hands and rotating as a pair
- In threes, can each group learn how to do a three-legged walk? What triangular formations are possible?
- In quads, the group need to do a rotational dance, e.g. right hand into the centre and skip clockwise for four steps before changing hands and changing direction and skipping back.
- In fives, is it possible to make some form of star shape or formation?

## 11. An Equal Review

At the gathering circle place three circles on a white sheet and a bag of cones nearby. In each circle place one symbol: +, - and something to represent “interesting”. Invite your children to reflect on their learning. They must take a cone place it in one of the circles and feedback accordingly. After several children have had their say, stop and look at the groups of cones in each circle. How equal are the comments? Can children now add in extra thoughts to make the feedback equal between each group?