

Week 3 - Package 1 - Year 5 and 6 Mathematics - Place value: The nasty game

Things you need

Have these things available so your child can complete this task.

Ideal

- Whiteboard or similar wipe-off surface
- Whiteboard marker and soft cloth
- Pack of cards with 10s, 11s, 12s, Queens and Kings removed
- 3-4 players

Back up

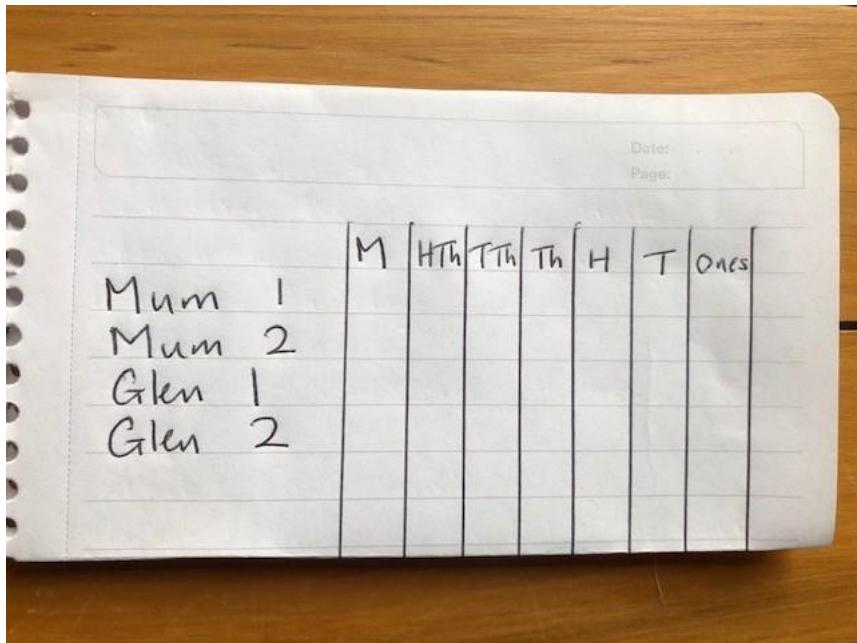
- Paper (grid paper is easiest but not essential)
- Pencils, pens or textas
- You can roll a die instead of turning over cards but that will only give you the numbers 1-6 to play with unless you have a 0-9 die.
- 2 players and 2 dummy players. It's nice to have dummy players even if there are more than two players as it gives each player more of a chance.

Before you start

The Nasty Game is an engaging, strategic and competitive way for your child to practice reading and understanding numbers up to 9 999 999 or nine million nine hundred and ninety-nine thousand nine hundred and ninety-nine. Before you start the game it is a good idea to check that your child can read aloud numbers of this magnitude. You can check this by writing down a few numbers and asking them to say them out loud as above. If your child finds this too hard then you should try playing the game with numbers up to 9 999 or nine thousand nine hundred and ninety-nine. If this is too easy, try somewhere in between.

Before you start you need to decide how you are going to record the game. One person could be responsible for the game card and record everyone's moves on a whiteboard or a large piece of paper. Alternatively, each player could record on their own small piece of paper.

This is the format for recording the game if there are 2 players only:



If you have more than 2 players you can choose to write each name once or still have dummy players. If you are using smaller numbers just use the places you need, for example Th (thousands), H (hundreds), T (tens), O (ones).

What your child needs to know and do

This is a very competitive game. It requires a knowledge and understanding of numbers up to 9 999 999. The aim of the game is to be the one who not only has the highest number next to their name, but can also say their number out loud. If they cannot do that the person with the next highest number who can say their number out loud is the winner. The winner gets 10 points and the person who comes second gets 5 points. Anyone left who can say their number gets 2 points. If you cannot say your number you get 0 points. Feel free to play around with the points system to suit your child.

What to do next

How to play the game.

Remove the 10s, 11, 12s, Kings, Queens and Jokers from the deck of cards, shuffle the cards and place the pack face down between the players. The Jack is equal to 0 in this game. Have your recording sheet ready.

Player 1 turns over the top card and makes a decision. They can choose to either put the number they have turned over on their own line as they try to get the highest number possible or, they can be nasty and put the number on one of their opponent's lines and try to give them the lowest number possible.

For example, Mum goes first and immediately turns over a 1. She could be nice and put it in her ones place or even nicer and put it in an opponent's ones place. Or, she could be nasty!



It would be useful at this point to ask Glen what number he has and he should respond by saying one million. If you are Mum you could also explain your thinking. "I decided to put my one in Glen's Millions place because that means the highest number he can get is 1 999 999."

Player 2 then takes their turn and once again can choose to be nice or nasty. For example, Glen turned over a 6. He did some strategic thinking and decided that as 6 is somewhere in the middle he would put it in the row that Mum has already targeted.



Play continues until all rows and all columns are completed even if someone already has the largest number. Remember there is a points system.

The player with the largest number says their number out loud:

- If they say it correctly they get 10 points. Then the person with the second highest number says their number out loud and if they say it correctly they get 5 points.
- If the person with the highest number cannot say their number they get 0 points and the person with the second highest number has an opportunity to get the 10 points by saying their number correctly.

Here is the recording sheet at the end of the first game between Mum and Glen:

Mum 1	Mum 2	Glen 1	Glen 2	M	H	T	Th	Th	Th	H	T	Ours
9	3	1	9	9	8	6	2	9	1	2	9	
					6	5	5	5	1	8	9	
					1	4	6	6	2	1	9	
					9	8	7	8	1	9	4	

As you can see, Glen got the highest number. Mum asked him to say his number out loud and he was able to say nine million eight hundred and seventy-eight thousand one hundred and ninety-four. This was correct so Glen got 10 points in that round. Mum got the second highest number but she made a mistake when reading her number out loud so she got 0 points!

Play the game as many times as you like. The points are cumulative.

Options for your child

Activity too hard?

Use smaller numbers. You can even go down as far as tens and ones only for this game. Slowly build up the size of the numbers each time you play the game. This is also useful when playing with younger siblings.

Play the nice game. This means that you can only put the numbers on your own lines.

Activity too easy?

Spend more time discussing the strategies used.

Introduce the secret rule. One player gets to choose a new rule for the game but does not tell the other players. The other players have to watch the player who has made up the new rule and work out what the secret rule is in order to win.

Examples of secret rules:

- Must end up with an even number
- Must have no nines
- Must be the smallest number
- Cannot be above 999 999 – strategically use 0s for this one.

Find the difference between the highest and lowest number using a mental strategy.

Extension/Additional activity

The Nasty Game is very adaptable and can easily be used to practice reading and understanding decimal place value.

Before trying this game please check that your child can read decimal numbers correctly and order them from highest to lowest.

Try checking by ordering these numbers:

0.345, 34.05, 34.5, 34.055, 5.304, 34.81

Once your child has ordered them from highest to lowest, ask them to read them aloud. The lowest number should be read aloud as “three hundred and forty-five hundredths” not zero point three hundred and forty-five. The highest should be read as “thirty-four and eighty-one hundredths”.

Below are some examples of decimal place value recording sheets. The first ranges from tens to hundredths. The second has a range from hundreds to thousandths.

Date: _____ Page: _____				
T	O	.	Tths	Hths
Jenny		.		
Mum		.		
Sarah		.		
Dad		.		

Date: _____ Page: _____				
H	T	O	Tths	Hths
Player 1		:		
Player 2		:		
Player 3		:		
Player 4		:		

Many different people write about this game. You can find out more about one version of the game at NRICH from Cambridge University here: [Nice or nasty.](#)

Week 3 - Package 2 - Year 5 and 6 Mathematics - Reasoning with squares

Things you need

Have these things available so your child can complete this task.

Ideal

- 2 pieces of A4 paper – each a different colour
- Pair of scissors
- Spare paper and pencil

Back up

- 2 pieces of A4 paper – same colour
- 2 pieces of A3 paper
- 2 pieces of A5 paper
- Tearing along the fold works for this activity.

Before you start

This is a reasoning activity. It looks very simple but can take a long time. It is important to give your child time to think about the task before stepping in with a solution.

If your child is in Year 5 or Year 6 they should be very familiar with squares and their properties. Younger children can also join in the activity, however, as children have been recognising and describing squares since Kindergarten. They will just use different language.

Before students start the activity, you may need to show them how to create the two squares that they need.

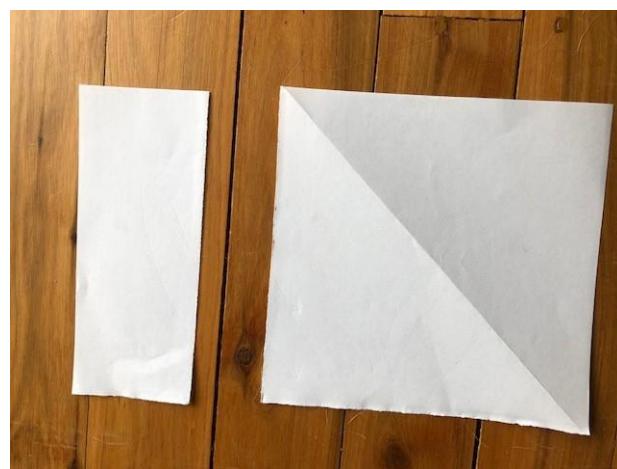
1. Fold one of the pieces of A4 paper in half and either tear along the fold or cut along the fold. This will give you two pieces of A5 paper. Put one of them aside.



2. Take one of the A5 pieces of paper and fold to create a square.



3. Cut or fold and tear the spare strip of paper.



4. Make another square in the same way but with the A4 piece of paper so you have a large square and a small square.

What your child needs to know and do

The first thing you need to do to check your child's understanding of squares is to ask them what the difference is between the two 'squares' they have in front of them and real squares. They should know that you cannot pick up real squares because they only have two dimensions – length and width. The paper squares in front of them have depth, even though it is very small. If they need more clarity you could get them to draw around the shapes they have made onto another piece of paper or take a photograph of them. They cannot pick up real squares because they only have two dimensions. These paper squares are just learning tools that are going to help us with an activity.

The next step is to ask your child to brainstorm everything they know about squares. They can write their ideas on a separate piece of paper or onto the squares themselves, or they can record themselves talking about squares. Here is a cheat sheet with some of the things they may know:

- Squares have 4 equal sides
- They have four equal angles that are right angles
- They have 2 equal diagonals
- They have 4 lines of symmetry
- They have two pairs of parallel lines
- The diagonals create right angles where they cross
- They have rotational symmetry around their central point
- They are a special kind of rectangle
- They are a quadrilateral

Your child may be able to tell you all of these things and more, or they may know just some of them.

Once you have established what your child knows, ask them to use one of the paper squares to prove what they have said what they know. For example, how can you use only the paper square to prove that all four angles are equal?

Hint: your child needs to manipulate the paper square by folding, but give them a little time to think this out.

The final and most important part of this activity uses both squares. Using only the two squares (no rulers) prove that the small square is exactly half the size of the big one. Remember to give your child time to think this through for themselves. It is not as easy as it looks. You may like to have a go yourself. There are some hints at the end of the document based on ideas from Year 5 and 6 students, but try not to look unless you have to.

What to do next

If your child manages to prove that the small square is exactly half the size of the large square see if they can explain what they have done to someone else, either someone in their family or one of their friends using a platform such as Skype or Zoom. Teaching someone else is the best way to embed learning.

Your child could also continue making smaller and smaller squares by halving the spare A5 paper and then halving the A6 paper and so on. They can then arrange them into a pattern. Two colours of paper really help here.

Options for your child

Activity too hard?

You may need to help your child to make the squares or make them yourself.

Remember that your child may use more everyday language to describe a square.

Activity too easy?

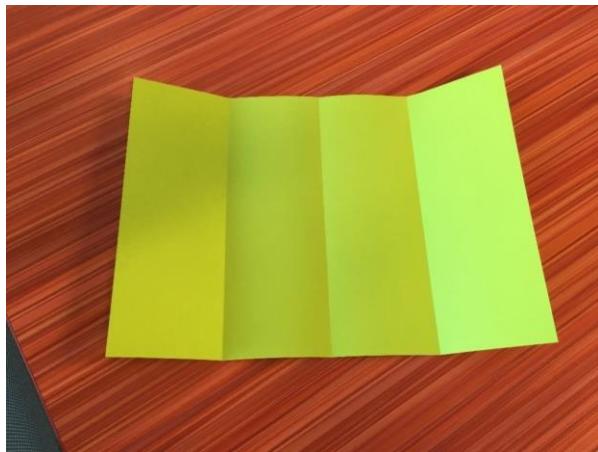
Ask your child to use two different methods to prove that one square is half the size of the other.

Extension/Additional activity

This activity can also be done with other shapes. Here are the instructions for making a rhombus:

Start with the two pieces of A4 paper as with the square and make one of them into two A5 pieces. Discard the spare. Fold each piece of paper as follows. This is tricky and you may need to help your child.

1. Fold into quarters to create parallel folds.



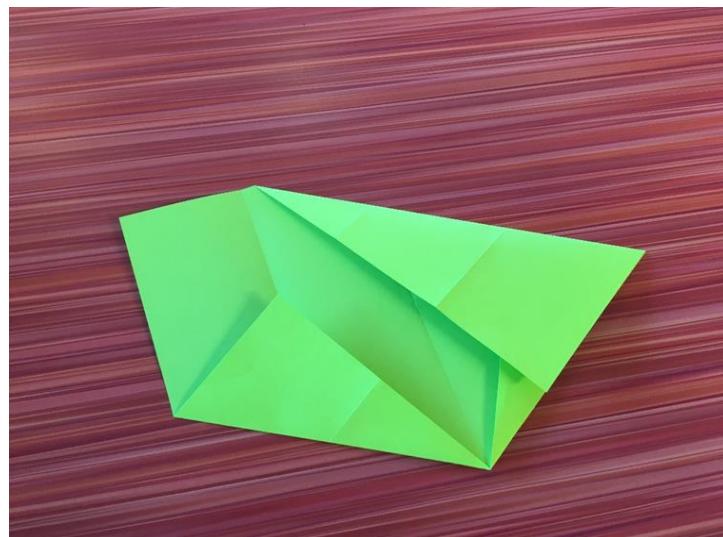
2. Fold in the bottom right, right angle so that it is pointing along the first fold from the right.



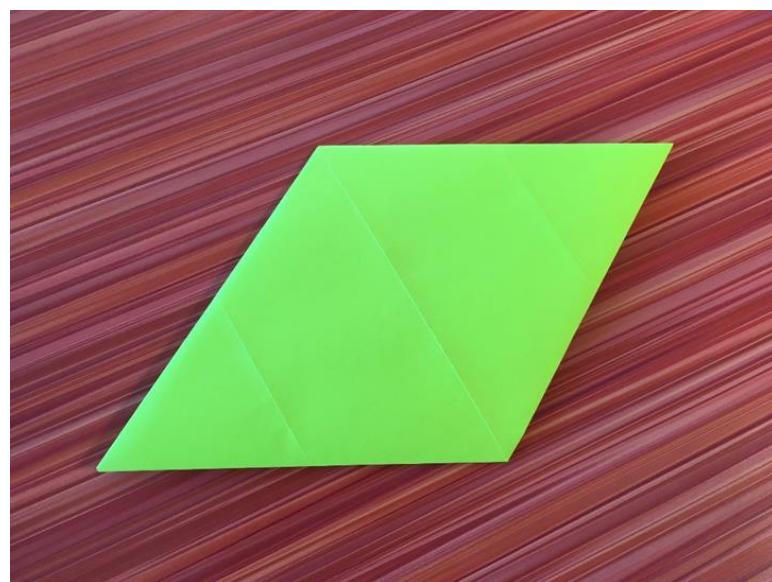
3. Fold in the bottom left right angle in the same way to make the folds symmetrical.



4. Fold the top right, right angle - angle over so that the right side of the piece of paper is directly over the fold you made in the last step. Make sure you have created a really sharp angle.



5. Do the same with the left side.



Once you and your child have made the two rhombuses you can do the activity in the same way you did with the two squares. However, there are many interesting things you can both do with the rhombus.

- How many folds do you need to make an equilateral triangle?
- How many folds do you need to make a right angled triangle?
- How many folds do you need to make a scalene triangle?
- How many folds do you need to make an isosceles triangle?
- How many folds do you need to make a trapezium?
- How many folds do you need to make a regular hexagon?

If you make a number of these rhombuses in different colours you can use them to make a variety of tessellating patterns and you can do the same thing with all of the other shapes you have made.

Hints for the Square activity as promised.

1. Try folding each of the squares into triangles.
2. Try putting the smaller square in the centre of the large one and rotating it 45 degrees so that each angle is touching the sides of the large square.

Week 3 - Package 3 - Year 5 and 6 Mathematics - Measuring muffins

Things you need

Have these things available so your child can complete this task.

Ideal

- Ingredients for Blueberry Muffin recipe (see below)
- Sieve, large bowl, wooden spoon, spoon, oven, 12 hole muffin tin, skewer ,wire rack
- Measuring jug, weighing scales
- Oven gloves
- Paper and pencil
- Counter, coins or other small set of countable objects such as Lego bricks

Back up

- If your child has allergies or does not like blueberries use one of your own recipes for muffins or biscuits. The recipe should be in metric measurements – grams, millilitres
- See your own recipe for requirements
- Conversion measurements if needed

Before you start

This is a fun activity that is also an opportunity to spend some time being creative with your child. It is important to allow enough time for the practical activity so that it doesn't become stressful. Also you may want to decide ahead of time who is going to be responsible for cleaning the dishes and who will clean the work space.

Remember this is a shared activity and you will be using a hot oven. If you prefer you could take charge of putting things in and taking things out of the oven.

Make sure you have all of the ingredients and equipment ready for your activity and a damp cloth or two for if things get messy.

What your child needs to know and do

Your child is going to help you bake muffins or another recipe of your choice that makes muffins or biscuits.

Blueberry Muffin Recipe

- 295g self-raising flour
- 90g salted butter
- 150g brown sugar
- 125g fresh blueberries
- 250ml milk
- 2 eggs, lightly beaten

Method

- 1.Preheat the oven to 180 degrees C (160 degrees fan forced) and grease a 12-hole muffin tin.
- 2.Sift the flour into the large bowl. Using fingertips, rub the butter into the flour until the mixture looks like fine breadcrumbs. Stir in the sugar.
- 3.Make a well in the centre of the flour mixture and pour in the blueberries, milk and lightly beaten eggs. Gently stir until just combined.
- 4.Carefully spoon the mixture into the greased tin.
- 5.Bake for 25 minutes or until a skewer inserted in centre of 1 muffin comes out clean.
- 6.Leave the muffins in the tin for 5 minutes before turning out onto a wire rack to cool.



What to do next

Before the muffins are shared and eaten, but after the washing up has been done ask your child to consider the following questions.

- Imagine that the muffins have been baked for a family of four. How many would each person in the family get?
- What other sized groups of people could you divide the muffins between and ensure that everyone got at least 1 muffin?

Ask your child if they would like to bake the muffins for their class at school when everyone is able to go back. The recipe gives the ingredients to make enough batter for 12 muffins. How many batches of the recipe would they have to make in order to make sure everyone in their class (and the teacher of course) gets at least one whole muffin?

Level 1: If you think this is going to be tricky for your child, stick to whole multiples, for example, they might double the recipe for 24 or triple for 36.

Ask your child then to rewrite the recipe so there is enough of each ingredient to make 2 or 3 batches.

On completion ask your child if this is a practical way of baking. Would all of the ingredients fit into the bowl? Do you have another muffin tin? Would it be better to bake the batches one after the other and leave the recipe as written?

Level 2: For students who are confident with decimals and fractions they could rewrite the recipe to make exactly 30 muffins.

On completion ask your child if this is a practical way of baking. Would all of the ingredients fit into the bowl? Do you have another muffin tin? Would it be better to bake the batches one after the other and leave the recipe as written?

Eat, and enjoy, the muffins.

Options for your child

Activity too hard?

You may need to support your child with reading the scale when measuring the ingredients.

Give your child 12 counters, coins or lego bricks to divide into as many equal groups as they can.

See option 1 above.

If your child has difficulty multiplying the amounts in the recipe by 2 or 3 ask if they can think of another way of doing it. If necessary a calculator can be used.

Activity too easy?

What would happen if there were 5 people in your family and everyone wanted their fair share? Draw a diagram of how you would share the muffins so that everyone got an equal share. This could take some time. What is the exact number of muffins that each person gets? This question could be answered as a fraction or as a decimal fraction. See option 2 above.

Extension/Additional activity

Counting the cost

Ask your child to draw up the following table on a piece of paper or on their device. Alternatively you could print out this table.

Ingredient	Cost per item	Cost for 12 muffins	Cost for 48 muffins
Blueberries			
Milk			
Brown Sugar			
Salted Butter			
Eggs			
Self Raising Flour			
Total Cost			

Explain to your child that if you didn't have any of these ingredients in your pantry you would have to buy them as packaged. This would mean that the cost for 12 muffins would be the same as the cost for all of the ingredients. This means that working out the costs of baking isn't as straightforward as it might seem.

Check that your child understands that 48 muffins would be four times the original number of muffins. For this column they will need to refer back to the original recipe and work out how much they will need to make 4 times the amount. Then they will need to refer back to the package size to work out the costing.

Was your child surprised by how little difference in cost there is for making 12 muffins and making 48 muffins? Can they explain why?

Week 3 - Package 4 - Year 5 and 6 Mathematics - Patterns

Things you need

Have these things available so your child can complete this task.

Ideal

- Sticky notes
- Watch the video [Raindrops](#).

Back up

- Counters, beads or small objects
- Images in lesson notes

Before you start

Find a space to use where you can move materials around.

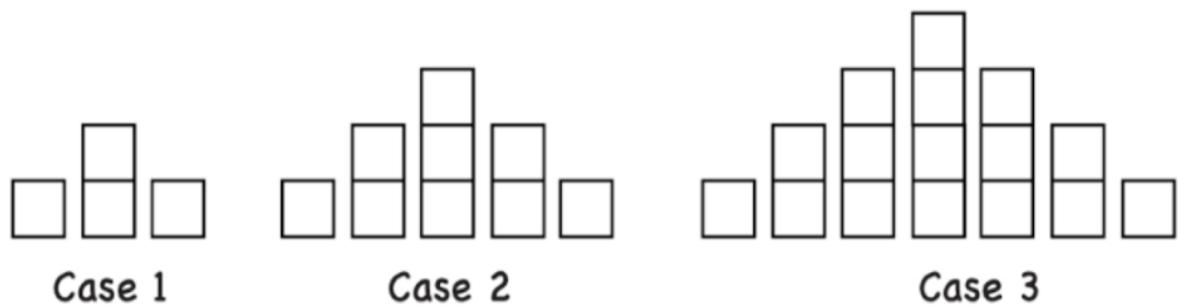
What your child needs to know and do

There can be a number of different ways to think about the same pattern.

What to do next

Display the picture below.

How do you see these patterns growing?

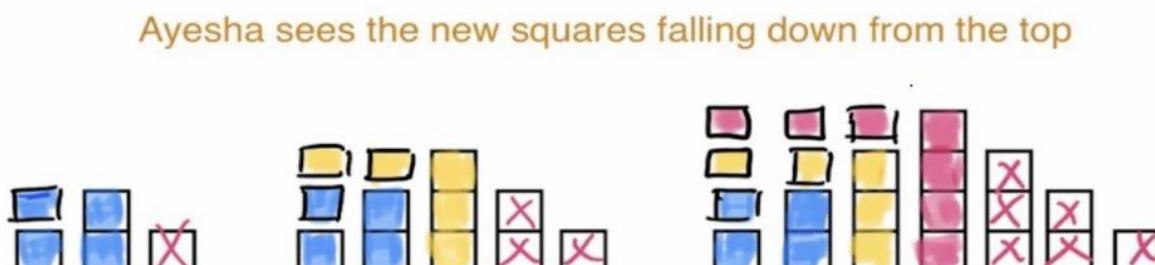
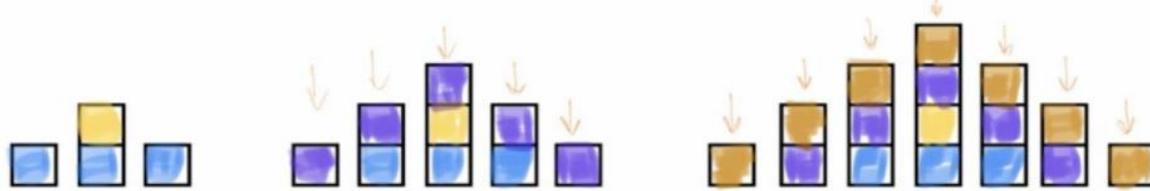
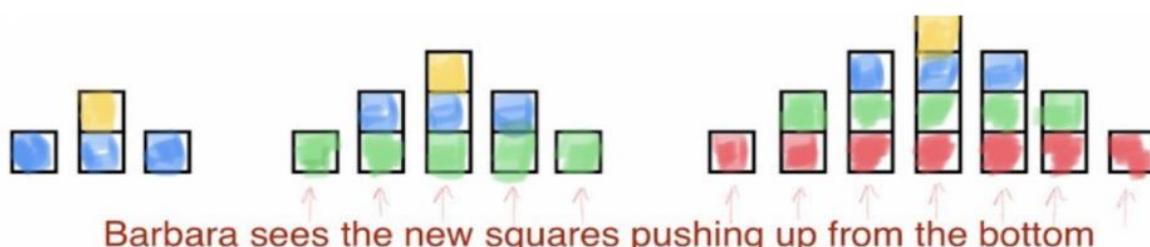


This image is from [Raindrop Task Final Copy](#)

Discuss things like:

- In case 2 there are more boxes than in case 1.
- In case 3 there are more boxes again.
- Where do you see the extra boxes adding each time?
- There are many ways to answer this question as people see the cases in lots of different ways. How do others see them?

Here are 3 different ways of thinking... Watch the video [Raindrops](#).



Michelle imagines the squares moving to make a bigger square. She sees the new small squares along 2 edges.

- Mathematicians often like to draw diagrams and use tables to help them identify patterns.
- Can you use these strategies to help you work out what the 10th case would look like?
- Is there an equation for solving this number pattern?

Options for your child

Activity too hard?

Work out the 4th and 5th cases and use that to help you work out the 10th case.

Use objects to create other patterns. Eg use beads to make a pattern and describe it to someone else.

Activity too easy?

Describe the pattern you see using an algebraic expression.

Extension/Additional activity

Try out another pattern challenge [Days and Dates](#). This one is from NRICH maths.

Week 3 - Package 5 - Year 5 and 6 Mathematics - Keeping to a budget

Things you need

Have these things available so your child can complete this task.

Ideal

- Print out this lesson
- Blank paper for working out

Back up

- Blank paper for working out

Before you start

Most things cost money. We need to think about how much money we have to spend on certain things that we need or want. We often use the term budget to indicate how we are going to spend our money.

What your child needs to know and do

Students need to have strategies to add and subtract 4-digit numbers with decimals. Understand that 100 cents is equivalent in value to 1 dollar. Use their knowledge of Australian money. Use the Theatre Prices picture below to solve the problems.

What to do next



Image of theatre prices: Distance Education Primary School (2019) NSW Department of Education

1. A family of four want to go to the theatre. The information above shows the pricing of admission and other costs, such as entry costs and refreshments (food and drink).
2. One child and one adult go to the theatre. They have a budget of \$160 in total to buy their tickets and some snacks. What snacks and tickets might they buy? What are 3 different options for how they could spend their money?

Options for your child

Activity too hard?

Add different items to the menu.

Activity too easy?

Make up more difficult scenarios. Eg. If a group of 12 people and you have \$2000. What tickets can you buy for each person and still afford a snack each and 4 programs for the group?

Use other price lists to calculate budgets. Eg. Entry into an amusement park, zoo or a family meal at your favourite restaurant.

Extension/Additional activity

Plan a budget for a birthday party for ten people, 20 people or 100 people. Include the price of decorations, food, drinks, entertainment and anything extra you would like or need (napkins, cutlery).

Calculate the total budget for the birthday party.

Explore Moneysmarts task [Fun Day Out.](#)