Cambridgeshire County Council

Cambs Maths Team

Maths at home

A guide for supporting your child with their mathematics

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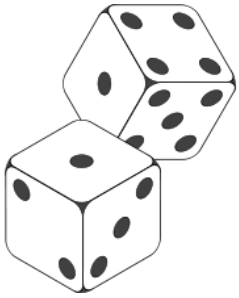

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Maths at Home

This booklet has been created to help you to support your child at home with developing their maths skills through fun and enjoyable activities.

Maths at home could include:

- Listening to and singing maths songs
- Playing games
- Using familiar objects to count, calculate and play. This might include using coins, dice and cards.

and lots more too!

Whichever activities you choose, try to make them fun and encourage your children to do their best. To avoid making maths at home stressful or boring, remember that there is more to maths than finding the answers. Maths also involves thinking about things creatively, looking for patterns, and making connections.

You don't needs lots of resources and equipment to have fun with maths at home. In fact you may even have many of the suggested resources already. There's also a section, at the back, that includes resources for you to cut out and keep.

Cambs Maths Team

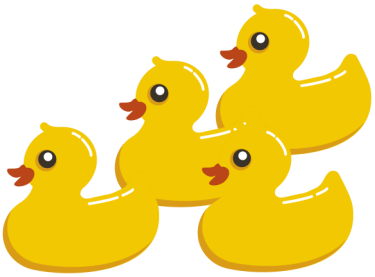
Early Years Maths

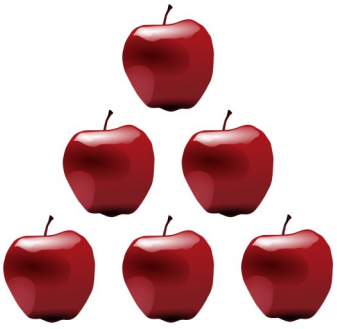
What do children learn at school in the Early Years?

In Reception and Nursery, children develop their understanding of numbers through counting and calculating simple addition and subtraction problems. They also use shapes and measurements to explore the world around them.

Counting games and activities

You can count just about anything, from toys and games to clothes and food.



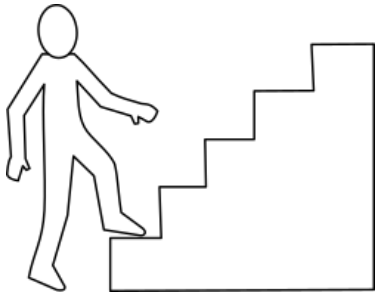


For online counting games and activities, have a look at the 'Family Learning' website: www.familylearning.org.uk/counting_games.html

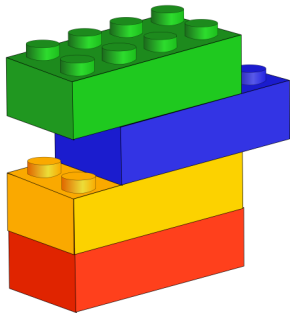
Further activities for you to try at home

- Sorting objects by their shape, size or colour, for example:
    - You could make piles with clothes sorted by colour or size
    - You could sort heavy or light objects onto lower or higher shelves
    - You could sort toys by their shape, size or colour

- Counting steps or up and down the stairs, adding and subtracting one, two or ten every time



- Build a tower with building blocks or construction toys



- Spot the difference game
    - Both players count out some counters, coins etc. to make a set.
    - Player One covers their eyes, whilst Player Two takes away some of the objects.
    - Player One takes their hand away from their eyes and says how many objects have been taken away.

Singing songs and rhymes, reading story books, and playing games can be a great way to have fun with maths. For more ideas and activities, turn to pages 14 - 24.

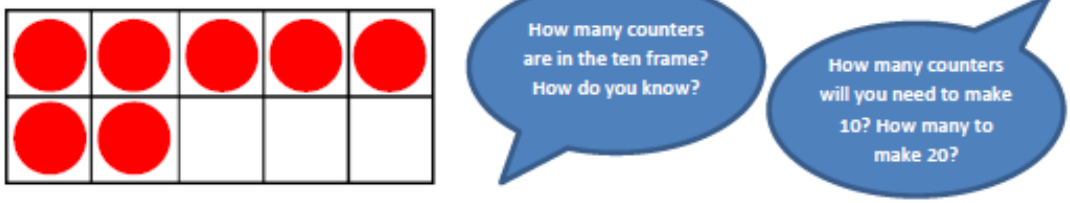
Key Stage 1 Maths

What do children learn at school in Key Stage 1?

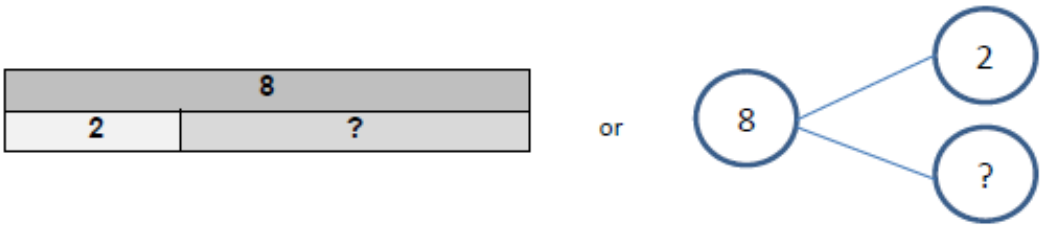
In Year 1 and Year 2 children develop their understanding of numbers so that they can confidently count and calculate with numbers up to 100, including comparing quantities of money, time and other measurements. Children also learn to describe, draw and compare different shapes.

Strategies used at school for learning number facts:

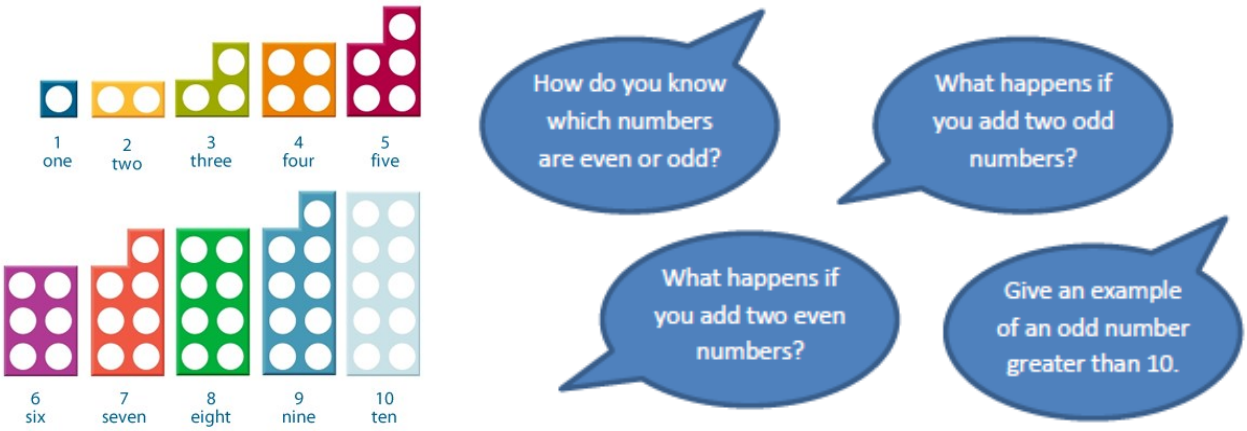
- Recall addition and subtraction facts to 10 using **ten frames**, for example:



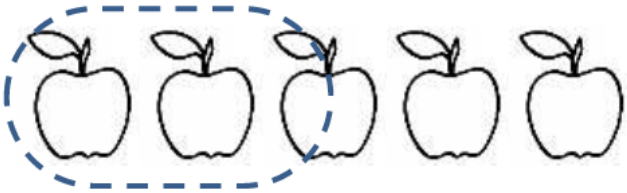
- **Part-whole representations** for numbers up to and including 20, for example:



- Identify odd and even numbers using **Numicon**, for example:

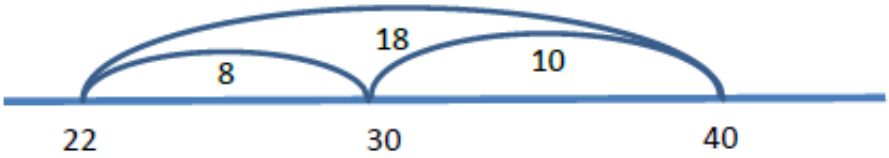


- Double and halving facts for numbers to 10, using physical objects, shapes and numbers, for example:



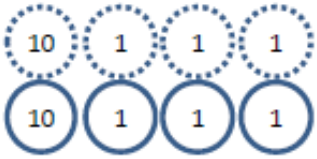
Half of 5 is 2 and a half

- **Empty number line** for supporting addition and subtraction, for example:

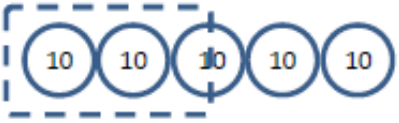


- Doubling and halving numbers with **arrays**, for example:

Double 13 = 26
Half of 26 = 13



or Half of 50 = 25
Double 25 = 50



- Recalling multiplication and division facts for the 2, 5 and 10 times tables using **coins**, for example:

2 x ☐ = 14

5 x 8 = ☐

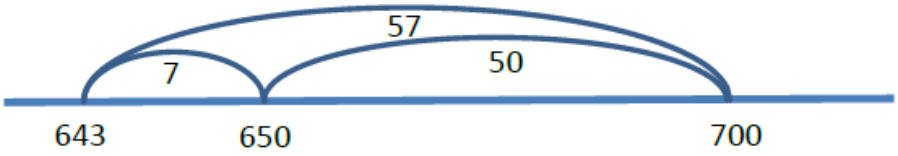
Key Stage 2 Maths (Year 3 and 4)

What do children learn at school in Years 3 and 4?

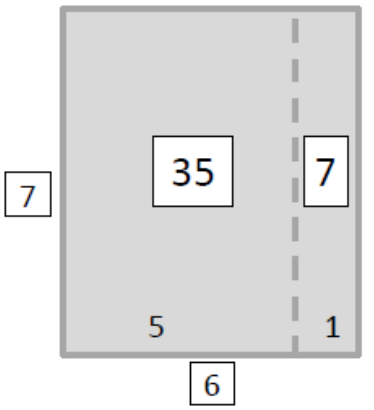
In Year 3 and Year 4, children develop their understanding of numbers through solving a range of problems involving money, measurements and time. Children also learn more about fractions and make links to decimal numbers. By the end of Year 4 children are expected to know their times tables facts, up to and including 12 x 12 (see pages 12 - 13).

Strategies used in school for developing number fluency:

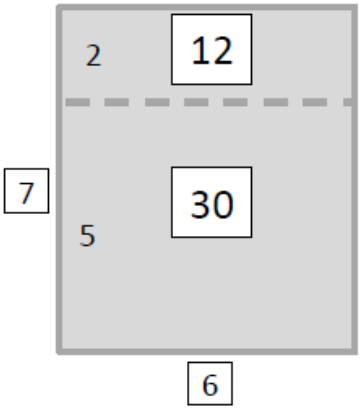
- **Empty number line** for supporting mental addition to the next 100, for example:



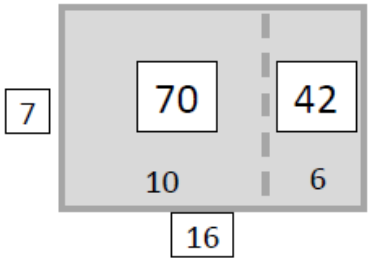
- Using **arrays** to support mental multiplication and division, using known facts, for example:



or



and



x	10	6
7	70	42

6 x 7 = (5 x 7) + (1 x 7)
6 x 7 = 35 + 7
6 x 7 = 42

6 x 7 = (6 x 5) + (6 x 2)
6 x 7 = 30 + 12
6 x 7 = 42

16 x 7 = (10 x 7) + (6 x 7)
16 x 7 = 70 + 42
16 x 7 = 112

Using money and measurements:

In school children are taught to recognise coins and notes, using these to solve problems like these:

Solve these questions and explain how you found your answers:

1. Is it possible to buy a soft drink, a salad and lasagne for £5.00?
2. If you had £6.50 to spend at Gino's Ristorante which items would you buy?

Gino's Ristorante	
Soft drinks	75p
Garlic bread	£1.25
Salad	£1.95
Lasagne	£3.45
Pizza	£5.50
Spaghetti	£4.75

Children also learn to record and use measurements of length, volume and mass to solve problems like these:

Parcel size	Max. Size	Max. Mass	Cost
Small	10 x 30 x 50cm	3kg	£2.75
Medium	30 x 50 x 90cm	5kg	£4.75
Large	50 x 80 x 100cm	10kg	£6.75

Using the information in the table above, solve these questions and explain how you know:

1. How much would it cost to send three large books?
2. What is the best way to send 12kg of rice?
3. Can you find an object in your classroom that would fit into one of the medium size parcels?

Key Stage 2 Maths (Year 5 and 6)

What do children learn at school in Years 5 and 6?

In Year 5 and 6 children build on their understanding of numbers, shapes and measurements and learn about percentages, ratio and proportion, and algebra. By the end of Year 6 children are expected to know how to use the formal, standard methods of calculation including long division.

Exemplification from the National Curriculum for Mathematics (DfE):

Addition and subtraction

789 + 642 becomes

$$\begin{array}{r} 7\ 8\ 9 \\ +\ 6\ 4\ 2 \\ \hline 1\ 4\ 3\ 1 \\ \hline 1\ \ 1 \end{array}$$

Answer: 1431

874 – 523 becomes

$$\begin{array}{r} 8\ 7\ 4 \\ -\ 5\ 2\ 3 \\ \hline 3\ 5\ 1 \end{array}$$

Answer: 351

932 – 457 becomes

$$\begin{array}{r} {\scriptstyle 8\ \ 12\ \ 1} \\ 9\ \not{3}\ \ 2 \\ -\ 4\ 5\ 7 \\ \hline 4\ 7\ 5 \end{array}$$

Answer: 475

932 – 457 becomes

$$\begin{array}{r} {\scriptstyle 1\ \ 1} \\ 9\ 3\ 2 \\ -\ \not{4}\ \not{5}\ 7 \\ \hline 4\ 7\ 5 \end{array}$$

Answer: 475

Short multiplication

24 × 6 becomes

$$\begin{array}{r} 2\ 4 \\ \times\ \ 6 \\ \hline 1\ 4\ 4 \\ \hline 2 \end{array}$$

Answer: 144

342 × 7 becomes

$$\begin{array}{r} 3\ 4\ 2 \\ \times\ \ 7 \\ \hline 2\ 3\ 9\ 4 \\ \hline 2\ \ 1 \end{array}$$

Answer: 2394

2741 × 6 becomes

$$\begin{array}{r} 2\ 7\ 4\ 1 \\ \times\ \ 6 \\ \hline 1\ 6\ 4\ 4\ 6 \\ \hline 4\ \ 2 \end{array}$$

Answer: 16 446

Long multiplication

24 × 16 becomes

$$\begin{array}{r} {\scriptstyle 2} \\ 24 \\ \times\ 16 \\ \hline 240 \\ 144 \\ \hline 384 \end{array}$$

Answer: 384

124 × 26 becomes

$$\begin{array}{r} {\scriptstyle 1\ 2} \\ 124 \\ \times\ 26 \\ \hline 2480 \\ 744 \\ \hline 3224 \\ {\scriptstyle 1\ 1} \end{array}$$

Answer: 3224

124 × 26 becomes

$$\begin{array}{r} {\scriptstyle 1\ 2} \\ 124 \\ \times\ 26 \\ \hline 744 \\ 2480 \\ \hline 3224 \\ {\scriptstyle 1\ 1} \end{array}$$

Answer: 3224

Short division

98 ÷ 7 becomes

$$\begin{array}{r} 14 \\ {\scriptstyle 2} \\ 7\overline{)98} \end{array}$$

Answer: 14

432 ÷ 5 becomes

$$\begin{array}{r} 86\ \text{r}\,2 \\ {\scriptstyle 3} \\ 5\overline{)432} \end{array}$$

Answer: 86 remainder 2

496 ÷ 11 becomes

$$\begin{array}{r} 45\ \text{r}\,1 \\ {\scriptstyle 5} \\ 11\overline{)496} \end{array}$$

Answer: $45\frac{1}{11}$

Long division

432 ÷ 15 becomes

$$\begin{array}{r} 28\ \text{r}\,12 \\ 15\overline{)432} \\ 300 \\ \hline 132 \\ 120 \\ \hline 12 \end{array}$$

Answer: 28 remainder 12

432 ÷ 15 becomes

$$\begin{array}{r} 28 \\ 15\overline{)432} \\ 300 \quad 15\times20 \\ \hline 132 \\ 120 \quad 15\times8 \\ \hline 12 \end{array}$$

$\frac{\cancel{12}}{\cancel{15}} = \frac{4}{5}$

Answer: $28\frac{4}{5}$

432 ÷ 15 becomes

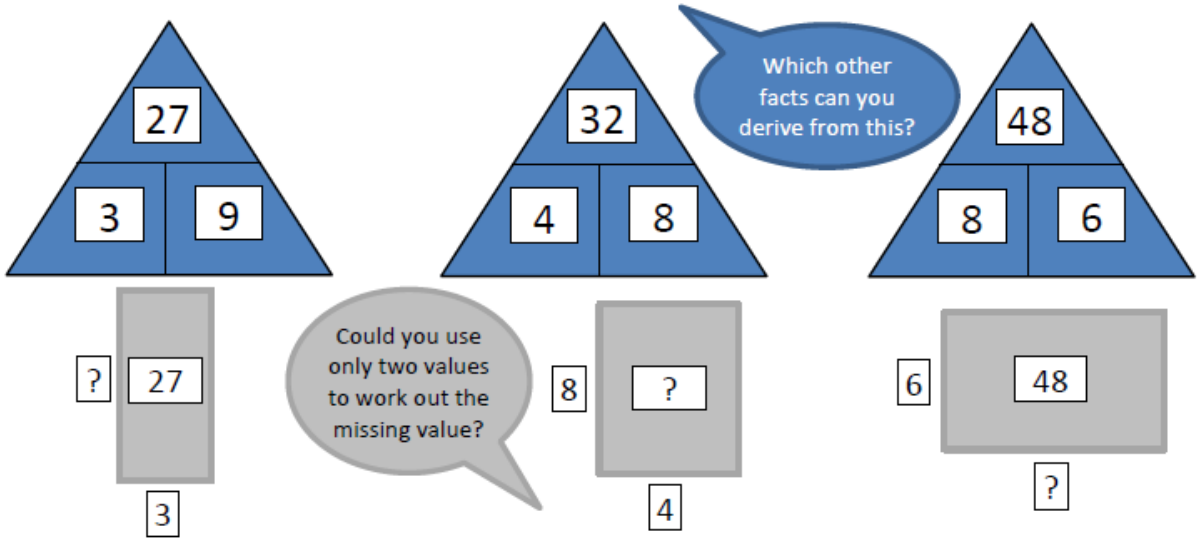
$$\begin{array}{r} 28\cdot8 \\ 15\overline{)432\cdot0} \\ 30\ \downarrow \\ \hline 132\ \downarrow \\ 120 \\ \hline 120 \\ 120 \\ \hline 0 \end{array}$$

Answer: 28·8

Learning multiplication tables

Strategies used in school:

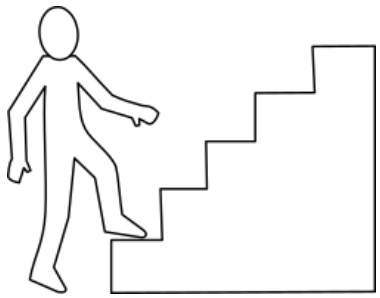
- Represent and recall multiplication and division facts for the 3, 4 and 8 times tables, using '**fact families**' and **arrays**, for example:



Activities that you could try at home:

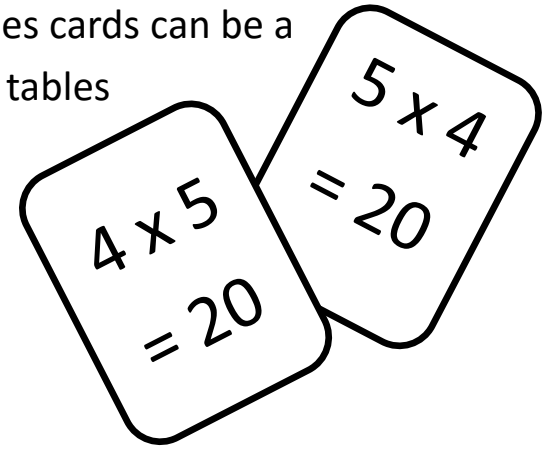
Counting steps

As you walk up and down steps or staircases, you can count forwards (or backwards) through your times tables.



Snap

Children can be encouraged to recognise 'twins' or pairs of facts: for example, 3 x 4 = 12 and 4 x 3 = 12. You can also do this with related division facts too! Playing snap with homemade times tables cards can be a great way to do this - there are lots of 'times tables snap cards' available to download for free online. For more information about learning maths skills through play, see pages 14 - 17.



Songs and rhymes

Learning times tables to a rhythm can help children to learn their facts in an enjoyable and memorable way. You can either purchase times tables songs on the internet or in good book shops; or you can find free songs to sing along to on YouTube as well. For more information about maths songs and rhymes, see page 17.

Websites with activities for learning multiplication tables facts:

- BBC Skillswise - http://www.bbc.co.uk/skillswise/topic/times-tables
- Top Marks - http://www.topmarks.co.uk/maths-games/7-11-years/times-tables

For more websites and educational apps, see page 22 - 24

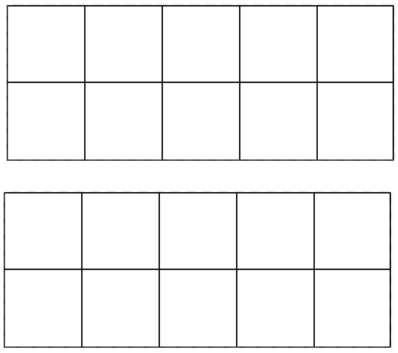
Maths through Play!

"What books are to reading, play is to mathematics. In a home full of blocks, puzzles, games and play is a home where mathematical thinking can flourish!" Dan Finkel PhD, founder of **Mathforlove.com**

'Ten Nice Things'

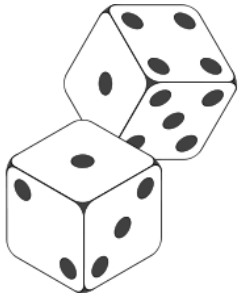
This game is easy to play, you just need a place to play and ten nice objects. Each player starts with a blank 'ten frame' (available on page 29) with no objects in it. Between the two players is a set of ten objects. The aim of the game is to be the first player to have all ten objects. How to play:

- Player One rolls a dice and takes that number of objects from the set in the middle.
- Player Two then does the same thing. If there aren't enough objects in the set in the middle, then Player Two can take objects from Player One.
- The game continues in this way, until one player has all ten objects.



'Chase the Rabbit'

This is a game for 3 or more players. One player is the 'Leader' and the other players are the 'Players'. The leader chooses a two-digit number of their choice and the players place their finger on that number, on their 100 Square (see page 26). The leader then gives a series of instructions, such as 'add 10', 'subtract 20', 'add 3', 'subtract 2' etc. After each instruction, the players move their finger accordingly. After three to five instructions the Leader asks 'Where's the Rabbit?' and the first player to give the correct answer is the winner. The game is fun and a great way to develop calculation skills.



Dice Games

Dice games are fun, easy to play and a great way of practicing maths skills. Classic games, such as 'Shut the Box', take little time to set up and can be lots of fun too. For a comprehensive list of traditional dice games, have a look at this list on Wikipedia: https://en.wikipedia.org/wiki/List_of_dice_games

Playing Card Games

Games with playing cards can be a great way to help your child to develop a wide range of maths skills from number recognition to decision making. Playing games like Snap or Pairs can be a great way to engage younger children, whereas 'Uno' or 'Top Trumps' might appeal to older children. For a list of card games for you to try, take a look at www.primarygames.com/puzzles/card_games.php

Puzzles and problems

Spot the difference, Dot-to-dot, paint-by-numbers, Sudoku and crossword puzzles can also be great ways to develop your child's number awareness and problem solving skills.

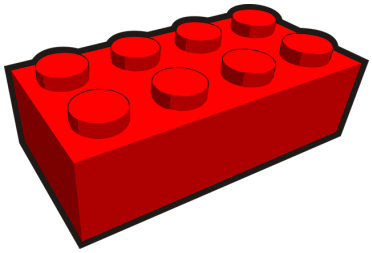
20 Questions

A game for two or more players, involving one person thinking of something (a number, a shape, or a household object) and the other players have to work out what it is by asking questions that can be answered 'Yes' or 'No'. For example, 'Is it a number between 0 and 100?' The players guessing only have 20 questions to work out what it is.

Construction Games

Playing with building blocks and construction kits can be a great way for children to develop their spatial awareness whilst having fun too! The website 'Lets Build It Again' is a great source of free-to-download instructions for the world's most popular construction kits:

http://letsbuilditagain.com/



Board Games

Playing board games can be a great way to help your child to become more familiar with numbers and counting.

For example, simple dice games, like Snakes and Ladders, can help children to learn about how to count on from any two-digit number. Whatever age your child is there is a huge range of board games for them to play and enjoy. Have a look at the 'Bright Minds' website for a regularly updated list of popular board games: www.brightminds.co.uk/board-games/c63.

Make your own board games

Alternatively, you can always choose to make your own board games instead. At the back of this booklet you will find a blank board game template and 'cut out and keep' dice too. For ideas and tips, have a look at the 'Activity Village' website, here: https://www.activityvillage.co.uk/design-a-simple-board-game.

Maths songs and rhymes

Learning through song is a popular way for many children to learn at home. Songs that you can sing and count along on your fingers, like *'Five Speckled Frogs'*, are always popular with young children. If you would like to see a list of songs and rhymes that you can try at home, have a look at the 'teaching your child' website http://www.teachingyourchild.org.uk/number-songs.htm

Maths Story Books

Maths story books can be a great way to learn about maths! Have a look at the 'Good Reads' website (https://www.goodreads.com/shelf/show/math-stories) for a list of books for children of all ages!

Online maths games

For maths games that can be played on your computer or tablet, have a look at the **Useful Websites** and **Maths Apps** pages and take a look at this web-site: http://www.maths-games.org

You can even play an online, interactive version of the game 'Shut the box' here on the NRICH: http://nrich.maths.org/6074

Real life maths

Shopping and saving money

Children love using and handling coins and notes in real life situations and role play games alike. By encouraging children to work out the total cost or calculating the change when buying food at the shops, they can practice their calculation skills and develop an appreciation of how maths helps us in our lives.

Saving money can also be a great way to develop number and calculation skills. By counting coins into money bags, children can practice repeated addition and multiplication skills.

Activities and games for you to try with coins at home:

* Counting with coins: collect coins with the same value and use them to help practice multiplication tables facts.
* How many coins? "If I have three coins in my hand, what is the largest or smallest amount of money I could have?"
* Pick a playing card from a deck and make the value on the card with coins. The player who makes the total with the fewest coins wins the card.
* Plan a party or special occasion using a budget and decide what to buy and how much money to spend on each item.

Online money games:

* http://mathszone.co.uk/using-applying/using-money/
* http://www.kidsmathgamesonline.com/money.html
* http://www.topmarks.co.uk/maths-games/7-11-years/money

Cooking and baking

Cooking and baking at home gives us an opportunity to develop lots of maths skills, including:

* measuring the mass of ingredients and the volume of liquids
* calculating with whole numbers, in grams, and decimal numbers, in kg, when combining ingredients together.
* telling the time and calculating durations of time

Find recipes online, here: https://www.bbcgoodfood.com/recipes/collection/kids-cooking

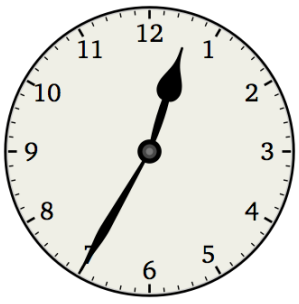
Telling the time

Using clocks, watches and other digital displays of the time can help children to develop their maths skills and prepare them for later life.

As well as telling the time, using the words *o'clock*, *minutes past*, *minutes to*, *half past*, *quarter to* and *quarter past*; you can also use clock faces to practice counting forwards and backwards in ones or fives, up to 60.

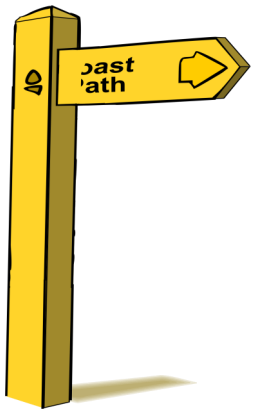
Telling the time activities for you to try at home:

* Go on a maths walk around your house or local area looking for different clock faces, including digital clocks.
* Work out when the TV show, or movie, is going to end. Or, if you have a TV guide, calculate the length or the programme from start to finish.
* Use a stopwatch during games and sports events to measure, record and compare times in seconds.
* Calculate with time by asking and answering the question, 'What will the time be in … minutes?'



Outdoor maths

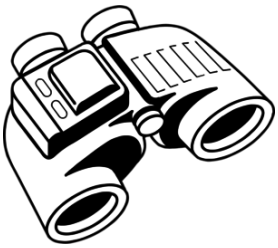
Reading maps



When going on a walk or when travelling somewhere new, look at the map together and discuss the route you will take. If you're feeling brave, let your child navigate the journey following the agreed route.

Go on a Maths Walk

Try looking for examples of the following things when going out for a walk:



- Numbers on buildings, or numbers of objects
- Shapes in buildings and in nature
- Symmetry in nature
- Examples of angles

Construction activities

Encourage your child(ren) to use their maths knowledge to:

* Build a tower or construction model using boxes or recycled objects
* Make, and fly, a kite!
* Build a den - think about which shapes will fit together, the size and amount of space you will need, and the mass of the objects you will use.

Playground games

Games like hopscotch are great for developing your child's awareness of numbers and counting skills. Or, you can count how many times you can 'hula hoop' or skip in a set amount of time. Clapping rhymes, Poohsticks, Grandma's footsteps and many other games can also help children to develop their understanding of shapes, measurements and time whilst having fun.

Measuring and comparing

If you have measuring equipment at home such as rulers, tape measures or measuring cylinders, you can measure lots of different things like the height of green plants or the amount of water in a bucket that has been left out in the rain.

Inspiring outdoor spaces

If you get the chance, try visiting one or more of these inspiring spaces:

* A maze - can you find your way to the finish with/without a map?
* The seaside - counting shells and building sandcastles can be a chance to have fun with counting and shapes without it feeling like a maths lesson
* The countryside - farms and fields provide lots of opportunities to count and calculate
* Train/bus station - there are numbers or timetables everywhere you look!

Useful websites

www.mathsisfun.com/

primaryhomework-help.co.uk/maths/index.html

http://wild.maths.org/

www.bbc.co.uk/education/

www.mathplayground.com/

www.counton.org/

www.iboard.co.uk/activities

www.amathsdictionaryforkids.com/dictionary.html

www.learninggamesforkids.com/

www.topmarks.co.uk/maths-games

mathszone.co.uk/

www.khanacademy.org/#/math

www.ictgames.com/resources.html

www.abc.net.au/countusin/games.htm

www.kidsmathgamesonline.com/

www.arcademics.com/

https://education.lego.com/en-gb/primary/explore/maths

https://education.minecraft.net/

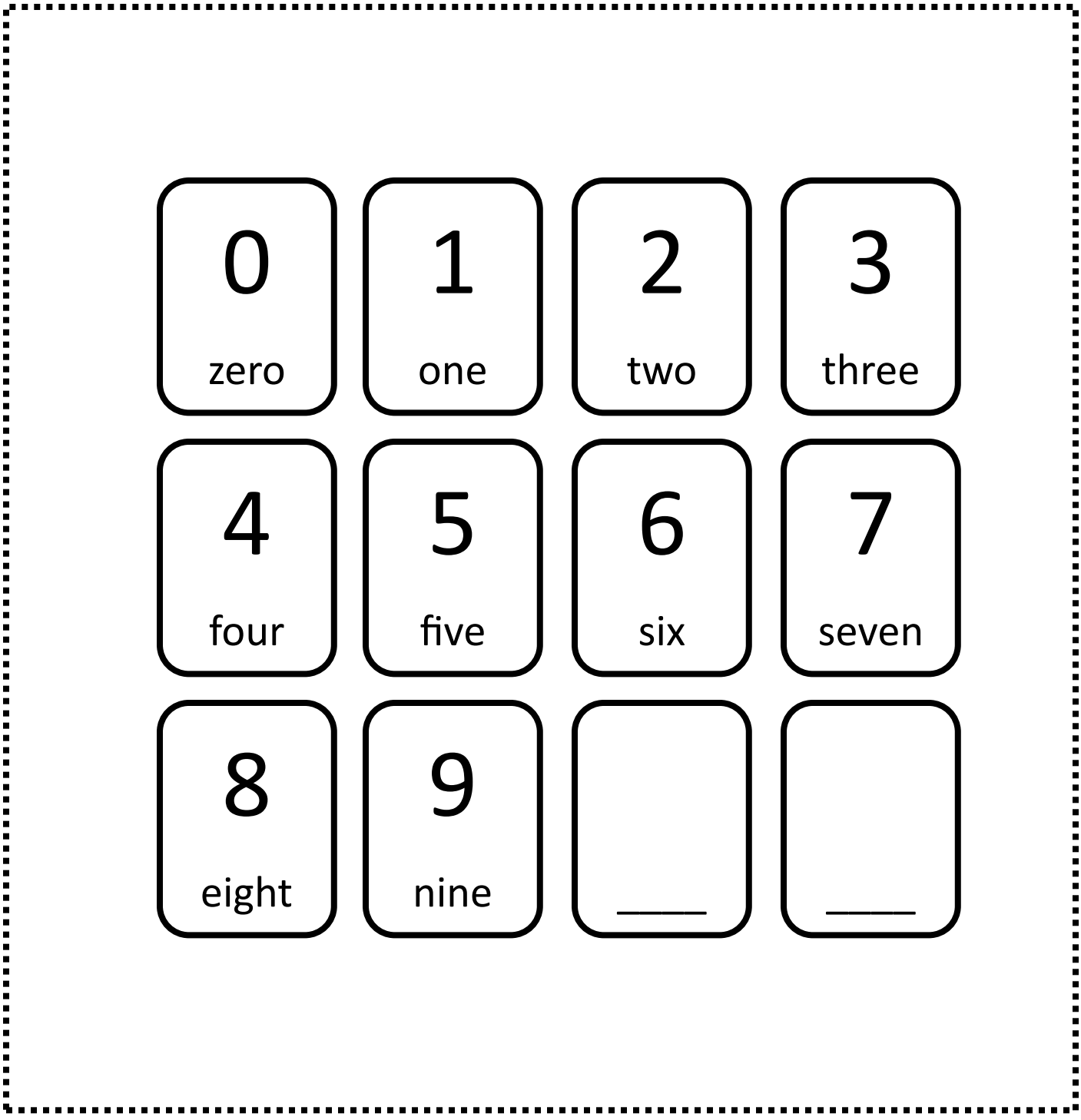
Please note that these websites are created by third party companies, therefore the Cambridgeshire Maths Team cannot take creative credit or responsibility for the content on these pages.

Popular Maths Apps

Free apps (some may contain 'In-App Purchases') for iPad

- 10 Minutes a Day Times Tables (by Dorling Kindersley)
- Brain Pop UK Featured Movie (by BrainPOP)
- Bee-Bot (by TTS Group)
- LightBot (by LightBot Inc)
- Maths, ages 4-6 (by onebillion)
- Maths Champions Lite (by Nicolas Lehovetzki)
- Maths Loops Lite (by James C.Carriero)
- Maths with Springbird (by Redu.us Pty Ltd)
- Maths Wiz Free (by Certification)
- Monster Math (by Makkajai Edu Tech)
- Number Pieces (by clarity innovations)
- Pizza Fractions (by Brian West)
- Quick Maths Jr (by shiny things)
- Shape Monster (by Tappeal AB)
- Simple Sums Free (by SyGem Software)
- Sumdog (by Sumdog Ltd)
- Tap Math (by Nicolas Lehovetzki)
- Thinking Blocks (by math playground)

Cut out and keep:
Digit cards



Cut out and keep:
0-100 Square

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

These two '100 Squares' are organised differently, choose and use the one that is most helpful to you.

91	92	93	94	95	96	97	98	99	100
81	82	83	84	85	86	87	88	89	90
71	72	73	74	75	76	77	78	79	80
61	62	63	64	65	66	67	68	69	70
51	52	53	54	55	56	57	58	59	60
41	42	43	44	45	46	47	48	49	50
31	32	33	34	35	36	37	38	39	40
21	22	23	24	25	26	27	28	29	30
11	12	13	14	15	16	17	18	19	20
1	2	3	4	5	6	7	8	9	10

Cut out and keep:
Addition and Subtraction Facts

Developing fluency with addition and subtraction recall facts:

- One more (+1) and one less (-1)
- Double (a number multiplied by 2, or a number added to itself) and half
- Adding and subtracting zero
- Adding and subtracting two
- Adding near doubles (a number added to one more/less than itself)
- Adding and subtracting ten, then adding and subtracting nine
- Adding and subtracting number bonds of 10
- Subtracting half (using known doubling/halving facts, e.g. 6-3 = 3)

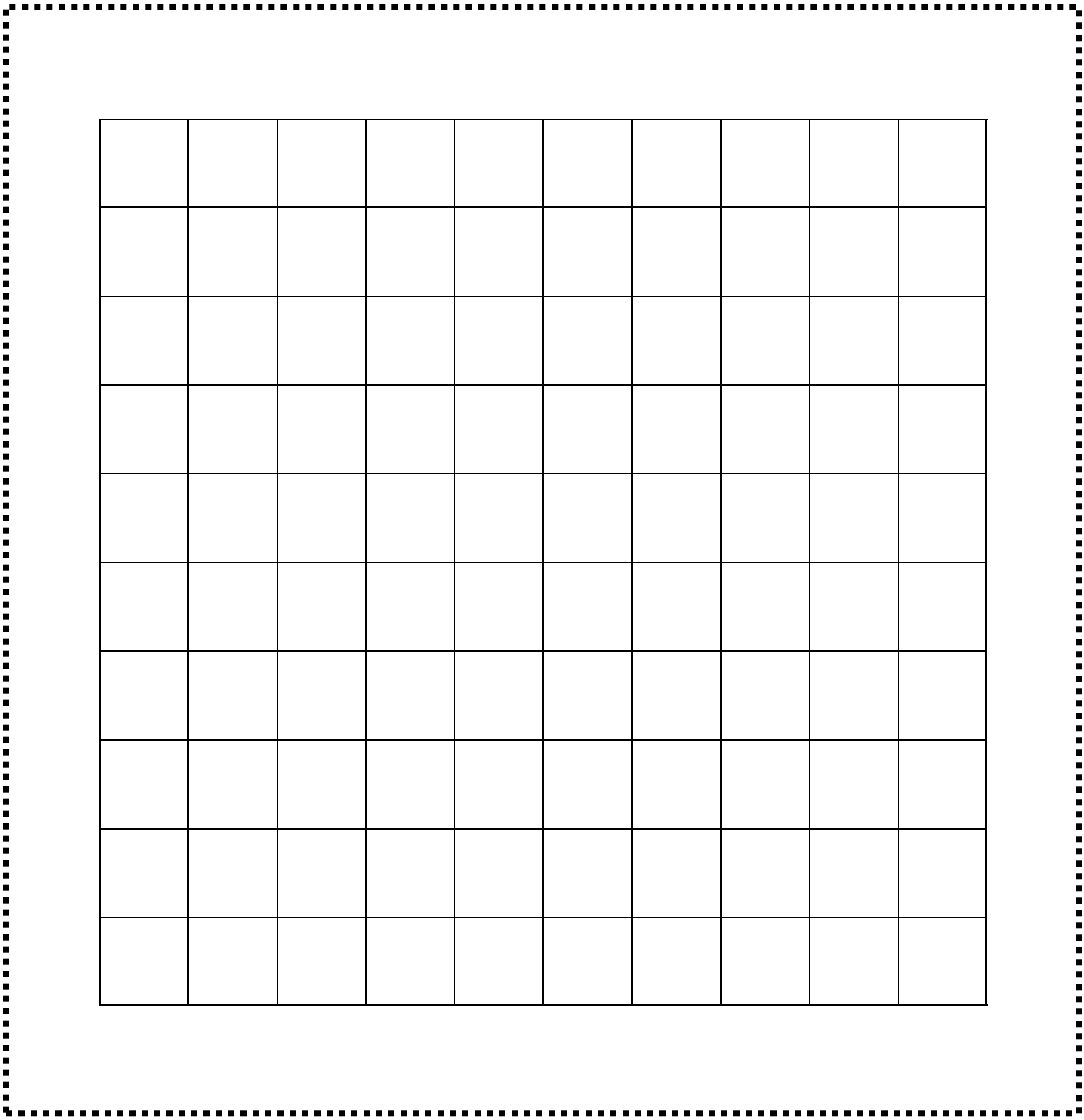
+	0	1	2	3	4	5	6	7	8	9	10
0	0	1	2	3	4	5	6	7	8	9	10
1	1	2	3	4	5	6	7	8	9	10	11
2	2	3	4	5	6	7	8	9	10	11	12
3	3	4	5	6	7	8	9	10	11	12	13
4	4	5	6	7	8	9	10	11	12	13	14
5	5	6	7	8	9	10	11	12	13	14	15
6	6	7	8	9	10	11	12	13	14	15	16
7	7	8	9	10	11	12	13	14	15	16	17
8	8	9	10	11	12	13	14	15	16	17	18
9	9	10	11	12	13	14	15	16	17	18	19
10	10	11	12	13	14	15	16	17	18	19	20

Cut out and keep:
Multiplication Tables Grid

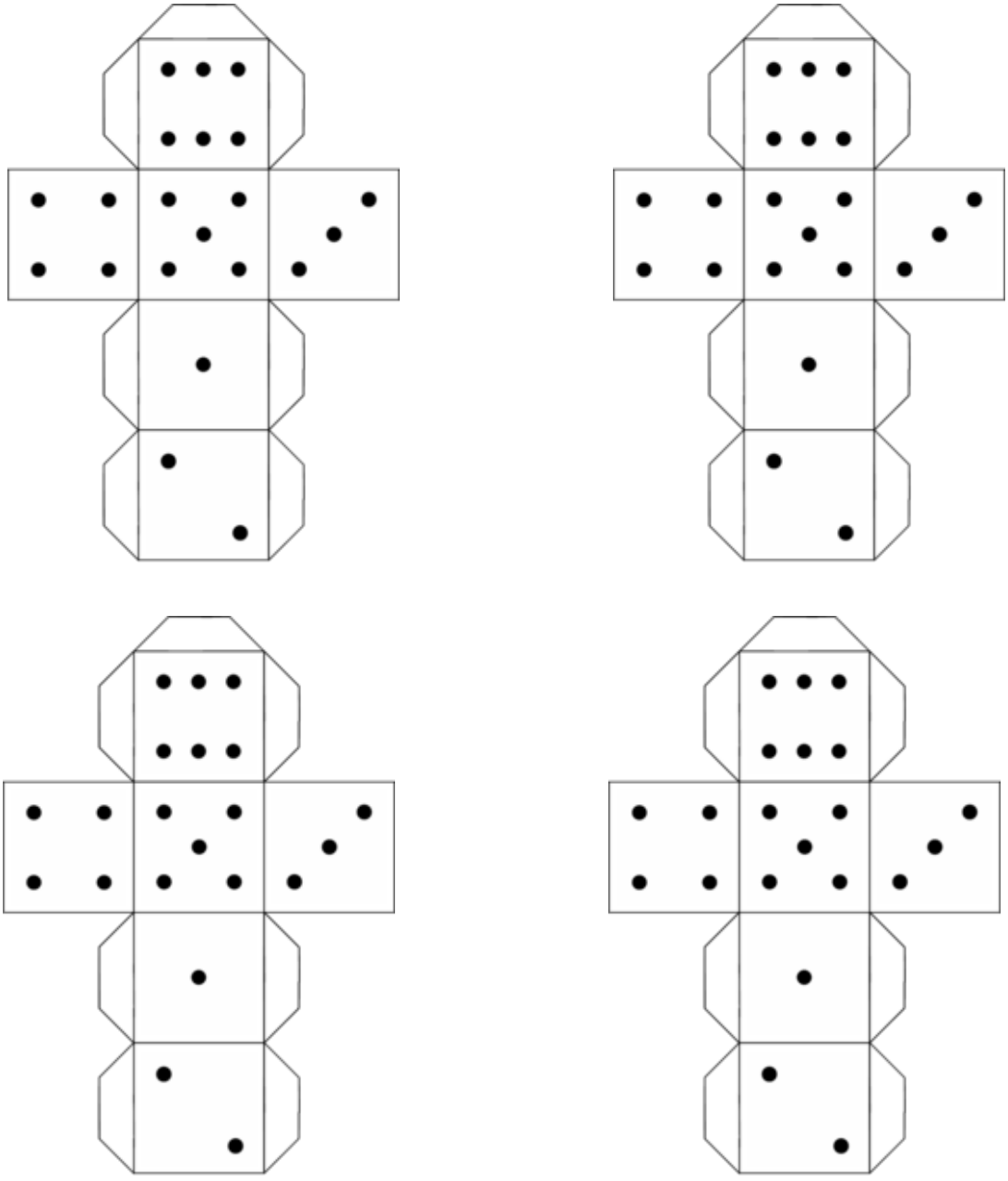
x	1	2	3	4	5	6	7	8	9	10	11	12
1	1	2	3	4	5	6	7	8	9	10	11	12
2	2	4	6	8	10	12	14	16	18	20	22	24
3	3	6	9	12	15	18	21	24	27	30	33	36
4	4	8	12	16	20	24	28	32	36	40	44	48
5	5	10	15	20	25	30	35	40	45	50	55	60
6	6	12	18	24	30	36	42	48	54	60	66	72
7	7	14	21	28	35	42	49	56	63	70	77	84
8	8	16	24	32	40	48	56	64	72	80	88	96
9	9	18	27	36	45	54	63	72	81	90	99	108
10	10	20	30	40	50	60	70	80	90	100	110	120
11	11	22	33	44	55	66	77	88	99	110	121	132
12	12	24	36	48	60	72	84	96	108	120	132	144

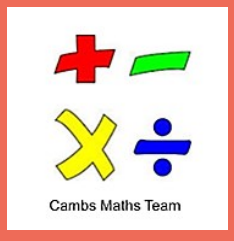
Cut out and keep:
Ten Frame (Useful for 'Ten nice things' game)

Cut out and keep:
‘Make your own board game’ square



Cut out and keep:
Make your own dice





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