

For the grown-ups

This book is full of hands-on activities that will tap straight into your child's natural mathematical curiosity. Each activity is designed to let your child play and learn with all their senses. Together, you can grow their love of maths, their creative problem-solving, and their understanding of the world.

Here are a few tips to help you along the way:

The lightbulb speech bubbles at the start of the activities suggest a learning objective for each game, but these should not limit your child's play. Involve your child in the preparation of each activity, let them follow the instructions, but also let them try out their own ideas and explore in ways that they find interesting. You never know what they might discover!

Your child should be supervised when experimenting with these activities, but try to give them time and space to lead the direction of play. The questions in this book are suggestions. Let your child ask, and answer, their own questions.

Adult Alert stars show where your child will need extra grown-up help.

Protect the area where your child will be playing and encourage them to wear old clothes. Be especially careful when using food colouring, which can mark fabrics and temporarily stain skin. Being prepared lets your child enjoy themselves to their fullest. Making a mess is part of the fun and learning!



00



Editor Hélène Hilton Designer and Illustrator Charlotte Milner Series Designer Rachael Parfitt-Hunt Editorial Assistance Sally Beets, Clare Lloyd Additional Design and Illustration Kithy Glavin, Rachael Hare, Victoria Palastanga DTP Designer Mohammad Rizwan Educational Consultant Penny Coltman Photographer Lol Johnson Jacket Designer Charlotte Milner Jacket Coordinator Issy Walsh Producer, Pre-Production Sophie Chatellier Senior Producer Amy Knight Managing Editor Penny Smith Managing Att Editor Mobel Chan Creative Director Helen Senior Publishing Director Sarah Larter

> First published in Great Britain in 2019 by Dorling Kindersley Limited 80 Strand, London WC2R 0RL

Copyright © 2019 Dorling Kindersley Limited A Penguin Random House Company 10 9 8 7 6 5 4 3 2 1 001–307831–Sept/2019 All rights reserved. No part of this publication may be reproduced, stored in or introduced into a retrieval system, or transmitted, in any form, or by any means (electronic, mechanical, photocopying, recording, or otherwise), without the prior written permission of the copyright owner. Adult ALERT

A CIP catalogue record for this book is available from the British Library. ISBN: 978-0-2413-1587-3

Printed in China

The publisher would like to thank the following for their kind permission to reproduce their photographs: (Key: a-above; b-below/bottom; c-centre; f-far; Helt; r-right; f-top) **27 Dreamstime.com**: Xjix (rab) All other images © Dorling Kindersley For further information see: www.dkimages.com

And a **big thank you** to Thomas Hellyar who acted as model and maths wizard

A WORLD OF IDEAS: SEE ALL THERE IS TO KNOW

www.dk.com

△ Contents

::

::

::

- 4 Little minds have big ideas!
- 5 Your maths senses
- **6** Maths treasure hunt
- 8 Sorting sizes
- **10** Clever counting
- 12 Number bugs
- 14 Hungry adding robot
- 18 Carnival cans
- 22 Magic pattern wands
- 24 Shapes
- 28 Make shape aliens
- **30** Measure me
- 32 Rainbow bottles
- **36** Gravity scales
- **38** Wacky watches
- 42 Pizza party
- 46 Look, you're a maths wizard!
- 48 Index



Little minds have big ideas!

You don't need a **fancy calculator**, or a whiteboard full of **big numbers** to be a maths wizard. You already have everything you need: **your brain** and **your amazing senses**!



Curious questions

Maths is full of puzzles to solve, things to work out, and brain teasers. Here are some questions to ask yourself as you play.

- How can maths ideas be useful in the real world?
- Where can I spot maths being used around me?
- How can I learn even more about these maths ideas and topics?





Yo_{ur} maths Se**nses**

Hearing

Your ears can listen to noisy patterns. Sounds can also be measured with maths.



Use your nose to find smelly maths clues!

 $\bigcirc D$

Brain

Your brain is not one of your senses, but it gathers information from them all and tries to understand it.

0 Sight

Mathematicians look at things carefully to see how they work.



Your tongue is great at tasting. You need maths to cook and follow yummy recipes.

Let's see what we can do! 🕐 Touch

Your skin tells you how things feel. Use your hands to compare sizes, textures, and shapes.

Maths treasure hunt

Maths is all around you! Ask your grown-up to take you on a **nature walk** to gather maths treasures.

Can you count your maths treasures?

Learn to find maths in your everyday life with this activity.

Wash your treasures (and your hands!) thoroughly. Things you pick up can be a bit germy.

What's maths?

Maths is all about numbers, shapes, measurements, and patterns. These things help us understand our world. You can use maths as a tool to solve problems and create solutions.

Pinecone

Which of your treasures feels the lightest and which is the heaviest?

Pebbles

Feel and count the lines on your leaf.

Leaf

Feather

Which treasures do you have most and fewest of?

Andt shapes can tou see

What colours can you spot on your nature walk? Shells

Sorting sizes

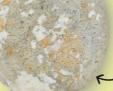
From the **tiniest** pebble you picked up, to the **heaviest** rock, and the **longest** feather, sort your nature treasures **from the smallest to the biggest**.

> Play this sorting game to learn about size. Use words such as big, small, bigger, smaller, biggest, and smallest.

Start with two pebbles. **Compare** them to see which is **bigger** and which is **smaller**.

Small stones on this side.

Play this game with toys if you haven't been on a treasure hunt yet.



Big stones on this side.



Biggest



Smallest



How else can you sort your nature objects?





What other words can you think of to describe the size of things?



Can you sort the stones in size order with your eyes closed?



Can you think of the difference between tall things and long things?

Sort your flowers from the shortest to the tallest.

Sort your sticks from shortest to longest.

There are lots of ways to sort your treasures. None of them is wrong if they follow a pattern.

Clever counting

Numbers are super useful to know. Learn your numbers to 10 and beyond with these awesome **mini games**. You'll soon be counting everything around you!

0.0

Count each pad as

Start here

you hop like a

little frog.

These games teach you how to count objects one by one and the order of numbers from 1 to 10.

Frog hopscotch

Boing

Cut big leaf shapes out of green card and number them. Stick them to the floor with sticky tack to make sure you don't slip over. Hop from pad to pad like a little frog, counting as you go.

> Adult ALERT!

You can make the hopscotch more challenging by going beyond 10, or by counting backwards.

You can add bubble wrap to the pads to make them squishy.

Your toys all wait to cross on the same side of the river. Count each toy as you help it cross.

Cross the river

Make a paper river. Collect little toys and place them all on one side of the river. Count each toy as you help them cross the river one by one. How many toys are crossing?

Ser and

Number fingers

m

Your fingers and thumbs are great tools to count to 10! Make these special gloves by sticking numbers on the fingers. Adult ALERT!

old gloves

Make the numbers with sticky labels or cut them out of felt and glue them on.

Number bugs

Number bugs teach you to match a quantity with its written number.

Make these cute number bugs to practise your **counting** skills and to start writing numbers.

You will need: pebbles red and paintbrush yellow paint marker pen big leaves Once the paint is dry, add details with a marker pen. Give each bug between 1 and 10 spots or black stripes. 0 Buzz! Count the spots and black stripes on each bug to Yellow pebbles are Red pebbles make sure you have all bees. Its face doesn't are ladybirds. the numbers from 1 to 10. count as a stripe!

Choose 10 pebbles to turn into number bugs. Paint the pebbles yellow and red.

Choose ten leaves and **number them** from 1 to 10.

Play the number bugs game by matching each bug to its leaf.

If you don't have pebbles or leaves, you can still play by making paper bugs and leaves.

Magic maths



How did your pebbles feel before you painted them?



Why do you think real bees and ladybirds have spots and stripes?



Can you practise writing your numbers in the air with a finger?

0

Hungry adding robot

This hungry robot loves to crunch **numbers**. Feed it special pom-pom food and **add up** how many pom-poms it has eaten **altogether**.

Learn how to add two lots of things together.

(all see 1)

glue and brush

kitchen foil

You will need:



cardboard box



scissors



tubes







14



Cut two holes in the top of the box for the tubes.

Magic maths



When do you add things together in your everyday life?



Can you feel and count how many pom-poms the robot is eating?



Try swapping the tubes around. What do you notice happens to the numbers of pom-poms?

> Cut **two circles** into the top of the box. Slot the **cardboard tubes** into the holes Cover them with **foil**.

sticky tack

16

Decorate the robot's face with eyes and a nose. Cut out **paper numbers** and fix them to each tube with sticky tack. Make me a body with another foil-covered box.

Time for dinner!

Count the robot food pom-poms as you drop them in (match the number on the tube). Find the total by counting the pom-poms in its mouth altogether.

How many are there altogether? My nose is the adding sign. It's called a plus sign.

Amazing adding

Adding means counting two or more groups of things **altogether**. You can write this as a number sentence. The **plus sign +** means add and the **equals sign =** means altogether.



plus equals altogether sign 3 = 5

Carnival Cans

It's carnival time! How many cans will you knock down, and **how many will be left?**

> Learn how subtraction (taking away) works and how to write it as a number sentence.

3



Carefully **cut** the **tail** off the two balloons.

5

Stretch the first balloon to wrap it over the ball of rice. Wrap the second balloon to cover the hole in the first balloon.

You can also play this carnival game with a tennis ball.

Time to Play!

Super subtracting Subtracting means taking away. You can write how many cans you knocked down and how many are left standing as a number sentence. The subtract sign – means take away.

Count your 10 cans and stack them.

> Throw the ball! How many cans did you knock over? How many are left standing?

This is the number you started with.

This is how many you took away.

The – means subtract (take away).

> This is the number left standing.

Magic pattern Wands Make this tasty magic Every maths wizard needs a magic wand to practise repeating patterns. maths wand! Make this tasty one with a repeating fruit pattern. You will need: Magic maths strawberries star-shaped cutter What patterns can you spot around you? Are there patterns on your clothes? How does your magic fruit wand taste? Can you clap your hands green and purple grapes skewers and click your fingers to make a sound pattern? Repeating patterns These are a set of things such as colours, objects, or shapes that are put in

Cut a strawberry into a star shape.

an order. Make a pattern by using the same order again and again.

The **Magic** pattern

Carefully **chop the strawberries** into small bits. **Slide one piece** onto the end of a skewer.

Slide a green grape onto the skewer.

Slide a **purple grape** onto the skewer.

Repeat the pattern: a red strawberry bit, a green grape, then a purple grape.

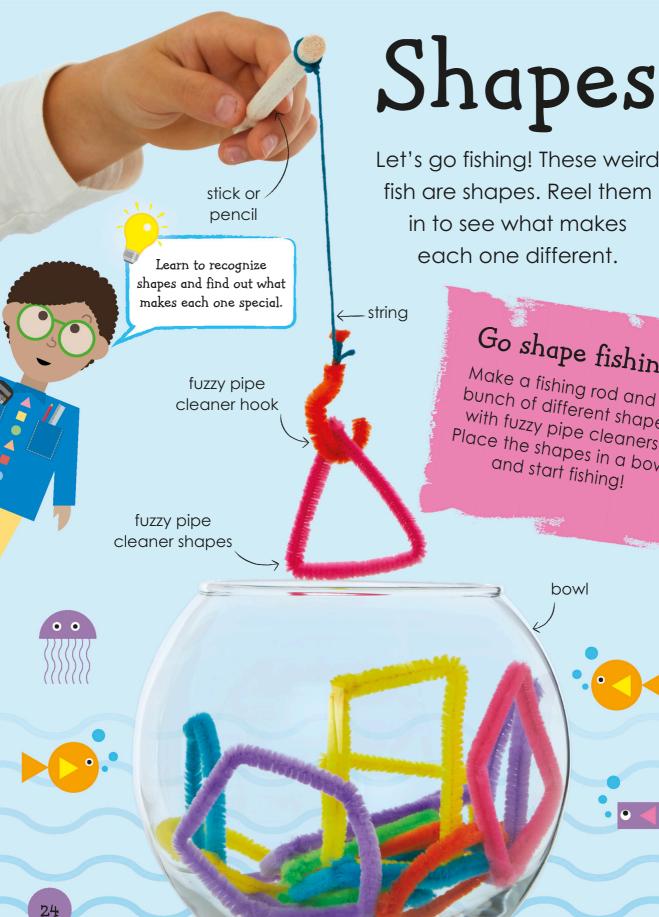
5 Keep repeating the **pattern** until the skewer **is full**, then pop the strawberry star on the end.

Making patterns

Adult ALERT!

> This wand pattern goes red, green, purple, red, green, purple... Only the star breaks the pattern. You can make up your own pattern now. Use two different fruits for a simple pattern, or more for a **challenge**.



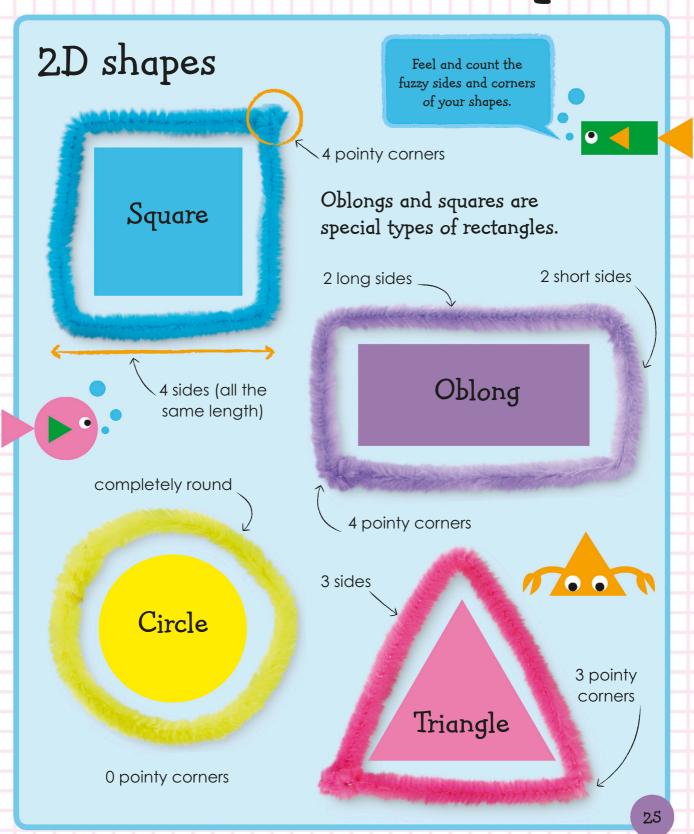


Go shape fishing Make a fishing rod and a

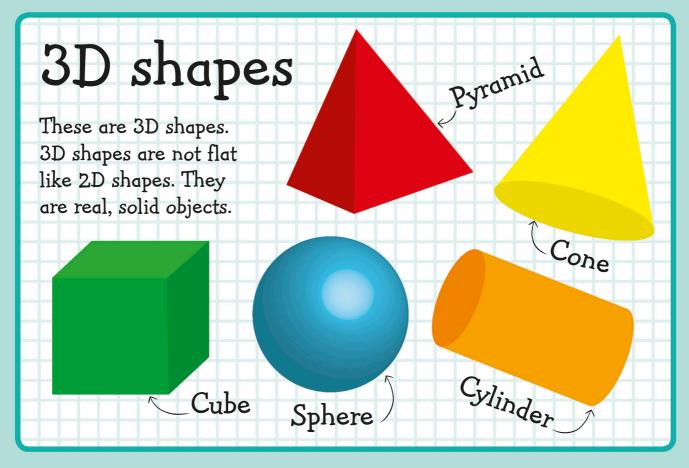
bunch of different shapes with fuzzy pipe cleaners. Place the shapes in a bowl and start fishing!

bowl

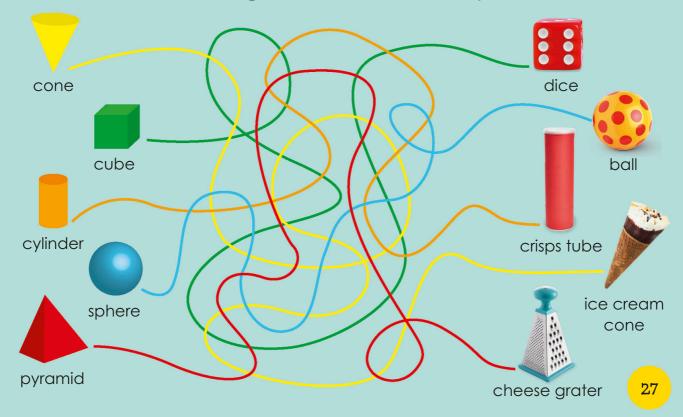
Get to know your shapes

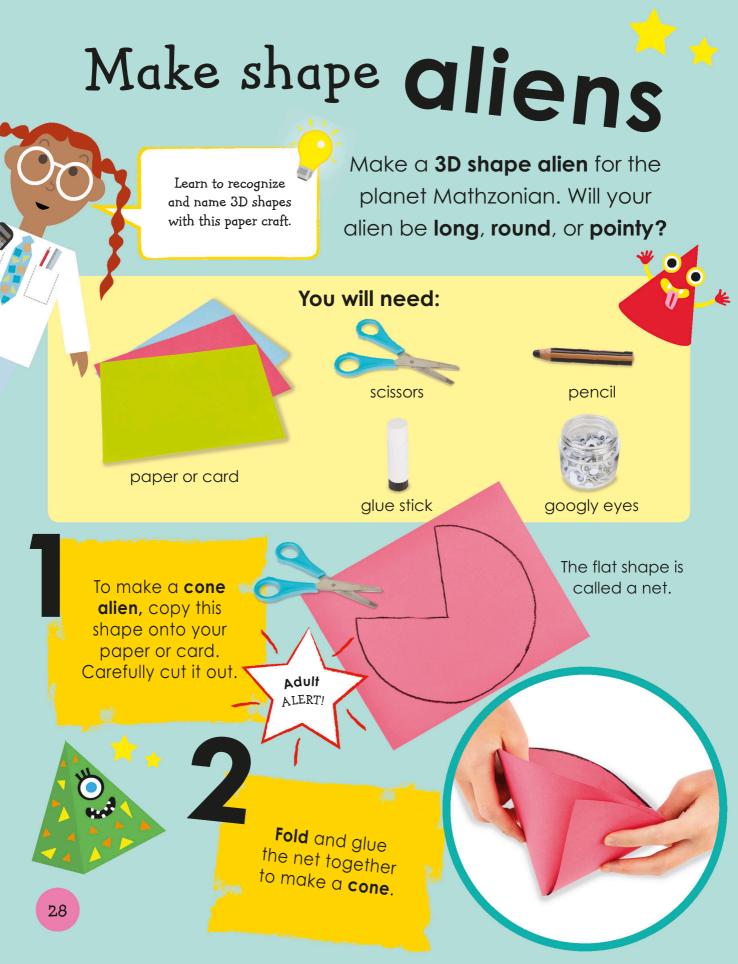


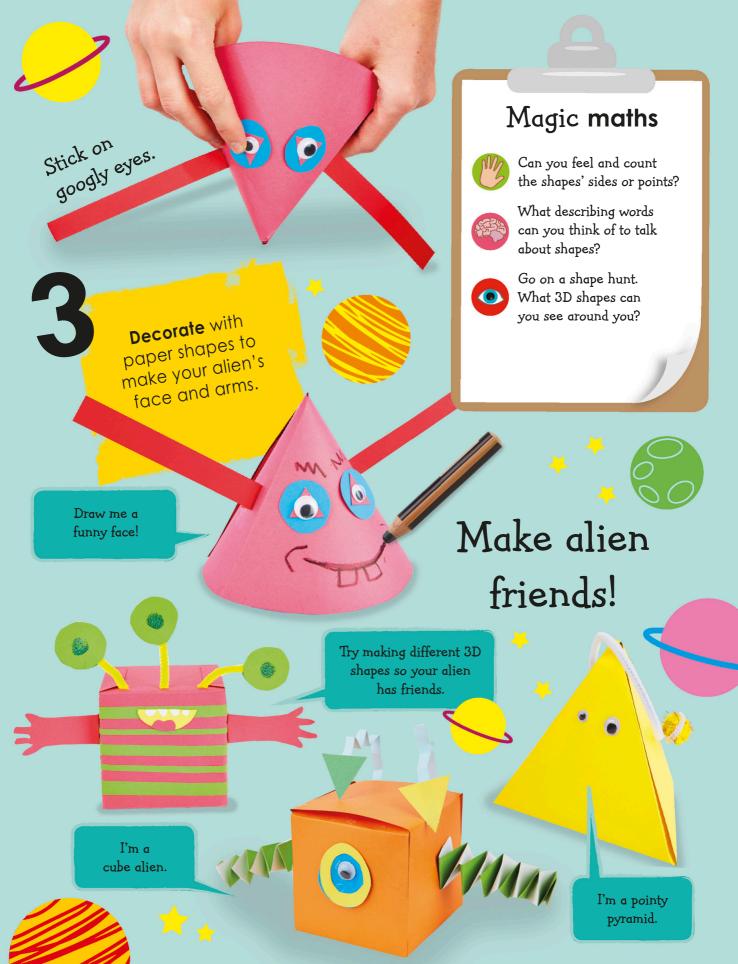




Match each 3D shape to its real life object.







Measure **me**

Do you know how tall you are? **Measure your height** by **comparing** it to other objects, like toys or shoes.

Make sure the

chalk can wash off your floor!

Learn to measure height and length using objects as a comparison.

Collect all your **shoes** together, then lie down on the floor.

Ask a friend to draw **a chalk line** on the floor at the top of your head and the tip of your feet.

> Line up the shoes heel to toe (without gaps) between both lines.

How many shoes tall are you?

I'm just four shoes tall.

How many cubes

tall is the guitar?

Measure your friends or your family to compare your heights. Use the same shoes to measure everyone. That way it's fair!

How tall are your toys?

You can use other things to measure yourself or your toys.

How many felt-tips tall is the robot?

Use the same objects to measure with if you want to compare the heights of your toys.



How many ducks tall is the recorder?

Rainbow bottles

Make this super colourful rice and Learn to measure how much can fit fill jars and bottles with a rainbow, inside something by one spoonful at a time. counting how many spoonfuls fill it up. You will need: jars and bottles uncooked rice play tub or dish of different sizes pot with lid food colouring vinegar spoon **Collect** as many jars and bottles of different shapes and sizes as you can. 32

Vinegar coats the rice so that the food colouring doesn't rub off.

3

To make rainbow rice, put some rice, a splash of vinegar, and a few drops of food colouring into a pot.

Shake! Shake!

Put the lid on your pot and **shake** it until the colour is all **mixed in**.

> Repeat with as many colours as you like.

yellow

blue

pink







Pour all your colours into a play tub or dish. **Grab a spoon** and fill each jar or bottle with pretty rainbow rice. **Count each spoonful**.



Use the same spoon to fill all the jars and bottles.

Which container holds the most rice? Which holds the least?





Shake it!

full

35

Magic maths



How does your rainbow rice smell? Do you like it?



How does the sound change as you fill and shake the bottle?

Why would it be useful to know how much can fit in a bottle?

nearly empty

Illinenett.

Shake the bottle as you fill it to hear how the sound changes.

half empty



Learn to compare the weight of your toys with these homemade scales.

Gravity and weight

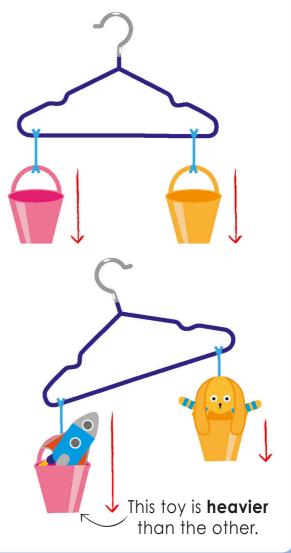
Gravity is a force that pulls everything on Earth towards the ground. Heavy things are pulled down more strongly by gravity, which is how these scales work.

When you put toys in the pots, the pull of gravity makes the scales tip down on the heaviest side.



homemade scales use gravity to show you the weight of your toys.

When the scales are empty, they are **balanced** because the pull of aravity is the same on each side.



Magic maths



Can you feel gravity work when holding the scales?

Can you sort your toys from lightest to heaviest?

How different do you think our lives would be without gravity?

Hold your scales loosely with your fingers so that it can swing.

> Some small things can be very heavy. It depends on what they are made of.

coat hanger

string

<

toys to weigh

The wooden toys are

heavier than the

cuddly bunny.

On the Moon, gravity is much weaker than on Earth so things (including people) weigh less.

identical plant pots

Wacky watches

Time isn't something you can see, but it can still be **measured**. You just need a watch or a clock.



Stick the two circles in the middle of the strap to make the watch face.

> 1 Ask a grown-up to make a little hole in the watch face and through the ends of both arrows. Poke the spilt pin through the holes and open it at the back.

Add 12 dots around the watch face. Check the

holes are big

enough for the

hands to spin.

Space the dots evenly around the circle.

You could swap the dots for numbers.

Decorate your strap as you like.

•••

strap with tape.

How will you decorate your watch strap?

:

::

time, Put your watch on by closing the

õ O

Your wacky watch won't tell you the time, but it can help you practise.

12

::

00

Magic maths



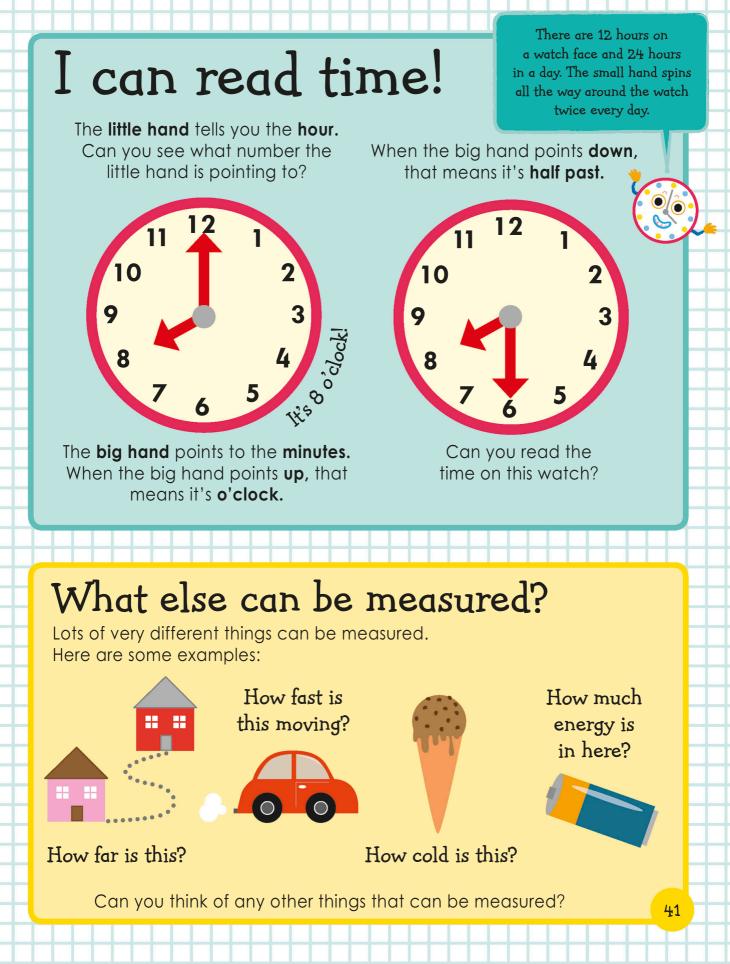
What words can you think of that are to do with time?

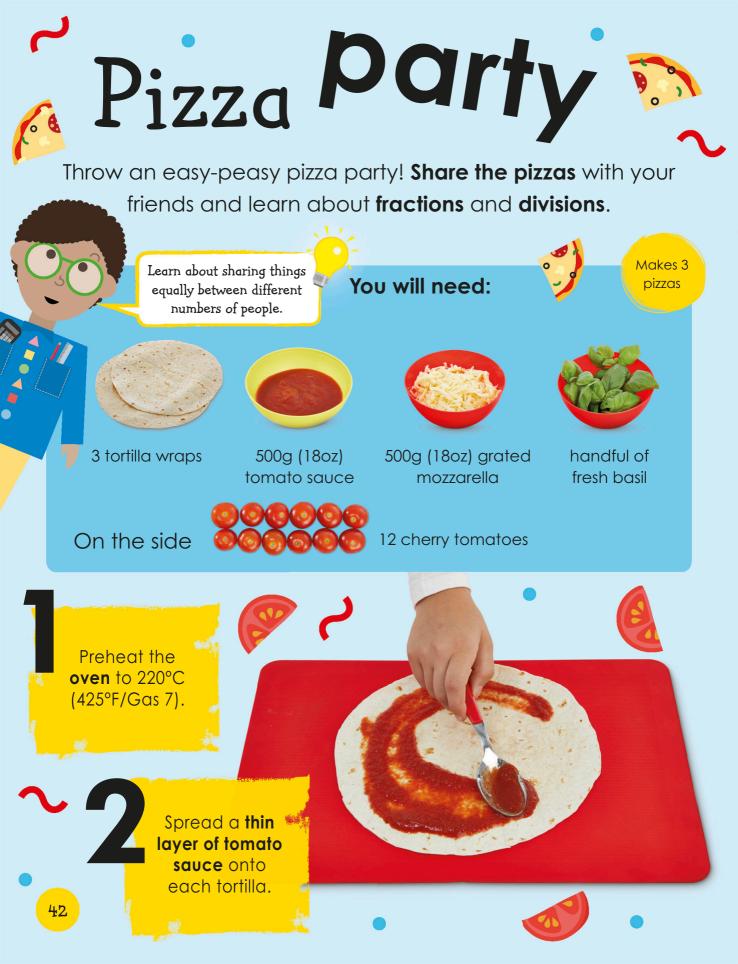
Can you hear the seconds ticking on a real clock?



Do you think measuring time is useful? Why or why not?

Real watches move at the same pace to measure seconds, minutes, and hours.





Bake each pizza for 5 minutes, or **until the cheese is golden.** Top with fresh basil.

Stare your Pizza

Sprinkle mozzarella all over the pizza.

> If you divide (share) 1 whole pizza, each guest gets a fraction (an equal share) of the pizza.

Adult ALERT!

If you share 1 pizza between 2 people, they each get 1 half.

Make sure your slices of pizza are all as equal as possible, so that everybody gets the same.

0

If you share
1 pizza between 3
people, they each
get 1 third.

Add a leaf of fresh basil to each slice.

If you share 1 pizza between 4 people, they each get 1 quarter.

Magic maths



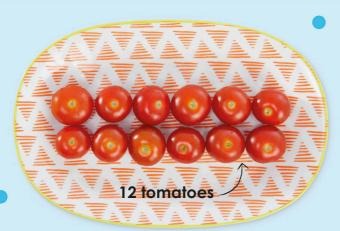
How do your ingredients smell? Do you like it?



How does your pizza taste as you eat it?

E Contraction

Why is it important to share things equally in maths?



Share the side tomatoes

Divide (share) the cherry tomatoes between your friends too. Make sure everybody gets the same number so that it's fair.



If you share 12 tomatoes between 2 people, they each get 6 tomatoes.

If you share 12 tomatoes between 3 people, they each get 4 tomatoes.



If you share 12 tomatoes between 4 people, they each get 3 tomatoes.

Look, you're a maths wizard!

Now that you've played with maths, you know that maths isn't magic: it's your amazing brain working it all out! Here are maths topics to keep playing with.

> Keep counting until you've run out of numbers! Endless numbers is called infinity.

There's no such thing as getting things wrong in learning. Every mistake teaches you something new, so you're always learning!

Shapes Shapes and lines are useful because they describe how things look. Some shapes have names, but most are unique and wobbly.

> Create your very own pretty repeating patterns.

() () () ()

Numbers

The world is full of numbers. By learning numbers and how

Patterns

Patterns can be made up of pictures, colours, numbers, or anything else that repeats itself. Being able to work out patterns is very useful. It's like guessing the future!

to use them, you can count

everything around you.



47

0

00

Measurements

From height, to time and speed, lots of things can be measured. Each measurement uses its own tool, like scales to measure weight. Measuring something just means comparing it.

Exercise your brain

With maths, you use both logic, to figure out what makes sense, and creativity, to decide how you could work it out. This brain workout can be tricky, but it's also fun.

Everyone uses maths every single day, even if they don't think about it!

nlatalata latalata "

Keep making maths magic!



Index

A, B, C

Add 14–15, 16–17 Alien 28–29 Bee 12–13 Bug 12–13 Can 18–19, 21 Carnival 18, 20–21 Coat hanger 36–37 Colour 7, 14, 19, 22, 32–33, 34, 38, 46 Compare 5, 8, 30–31, 36, 47 Count 6–7, 10–11, 12–13, 16–17, 21, 25, 29, 32, 34, 46

D, E, F

Divide 42–43, 45 Equal 17, 21, 42–43, 44–45 Fewest 7 Fingers 11, 13, 37 Fishing 24 Fraction 42–43 Frog 10 Fruit 22–23

G, H, I, J, K, L

Gloves 11 Gravity 36–37 Height 30–31, 47 Hopscotch 10 Ladybird 12–13 Leaf 7, 12–13

M, N, O, P

Measure 5, 7, 30–31, 32, 38, 40–41, 47 Most 7, 34 Number 4, 7, 10–11, 12–13, 14, 16-17, 18, 21, 39, 41, 42, 45, 46 Pattern 5, 7, 9, 22–23, 46 Pebble 7, 8, 12–13 Pipe cleaner 24–25, 26 Pizza 42–43, 44

Q, R, S

Rainbow 32–33, 34–35 Rice 19, 20, 32–33, 34–35 River 11 Robot 14–15, 16-17, 31 Scales 36–37, 47 Shapes 5, 7, 22, 24–25, 26–27, 28–29, 32, 38, 46 Share 42–43, 44–45 Size 5, 8–9, 32 Sort 8–9, 37 Subtract 18, 21

T, U, V

Take away 18, 21 Time 38, 40–41, 47 Tomato 42, 45 Treasure hunt 6–7, 8

W, X, Y, Z

Wand 22–23 Watch 38–39, 40–41 Weight 36–37, 47

