



breathing
together

Over 50
activities
for you to do
with your baby,
toddler and
pre-school
kids

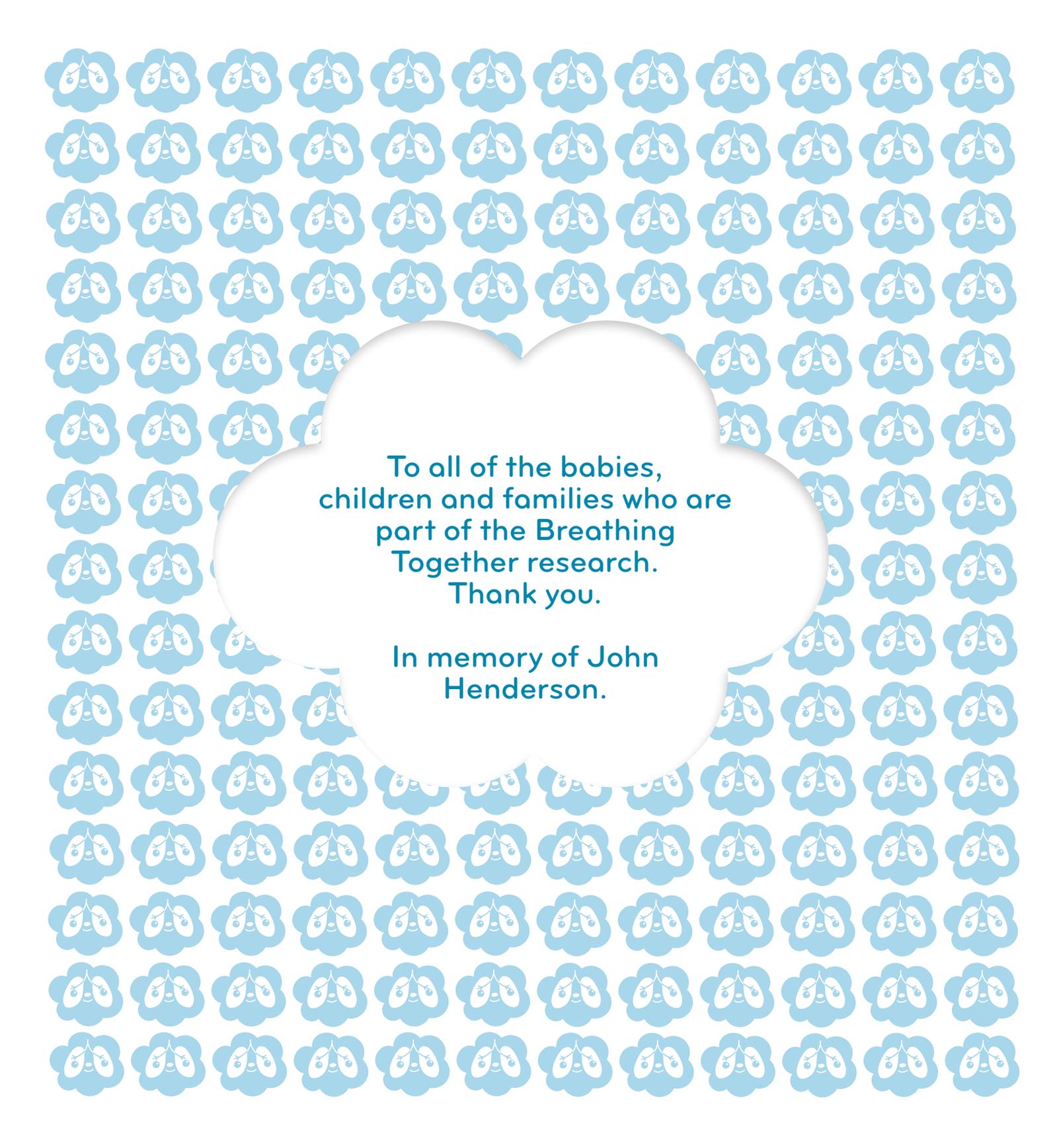
Inspired by real science
and developed with researchers

breathing together

Play and Learn Activity Guide



OKIDO



To all of the babies,
children and families who are
part of the Breathing
Together research.
Thank you.

In memory of John
Henderson.

breathing together

**Play and Learn
Activity Guide**



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Welcome to the Breathing Together Activity Guide!

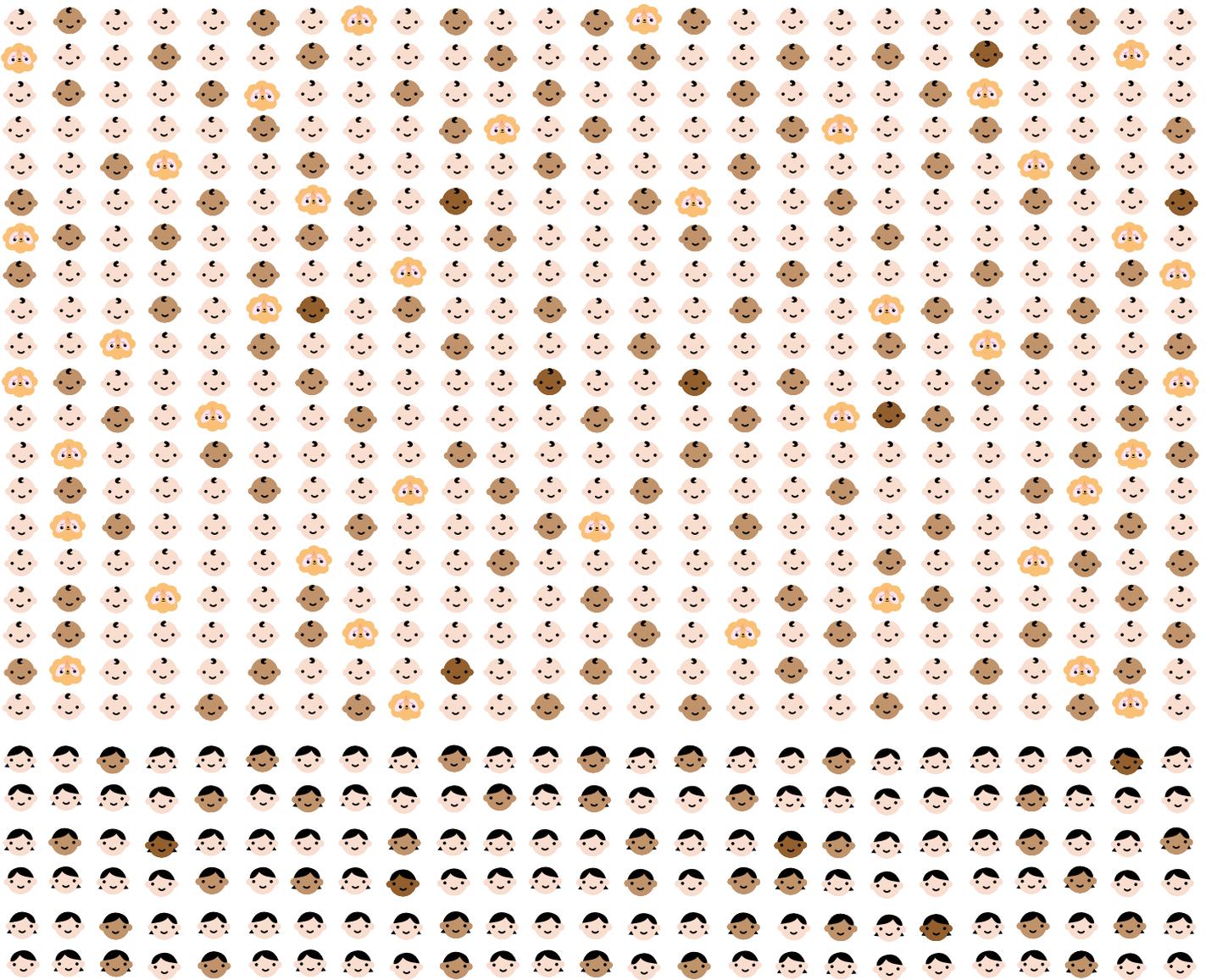
This book is for parents and other adults who spend time with babies, toddlers and children under five. It is a book full of ideas for activities to do with your child, which will allow you to explore breath, breathing and the lungs in fun and creative ways. The activities will create opportunities to play and learn together, discovering some of the science about how your lungs work and how to keep them healthy. We hope that the activities will lead to conversations between you and your child about how your breathing and lungs work. The most important thing though is to have fun and help your child to develop a positive relationship with their health and their body.

Why make an activity book all about breathing? This book is part of a much bigger project called Breathing Together. Breathing Together is a research study being undertaken by a team of nurses, doctors and scientists from around the UK, and even Australia.





These researchers are all working together to try and understand how the lungs of babies and young children grow and develop. The main aim of the research is to understand how asthma develops in children. The team want to find out why some children get asthma and others don't. They want to know what happens to the cells that line the airways as children develop. They want to learn about the role of the bacteria in our lungs. And they want to understand how allergens such as dust mites or pollen might trigger asthma.



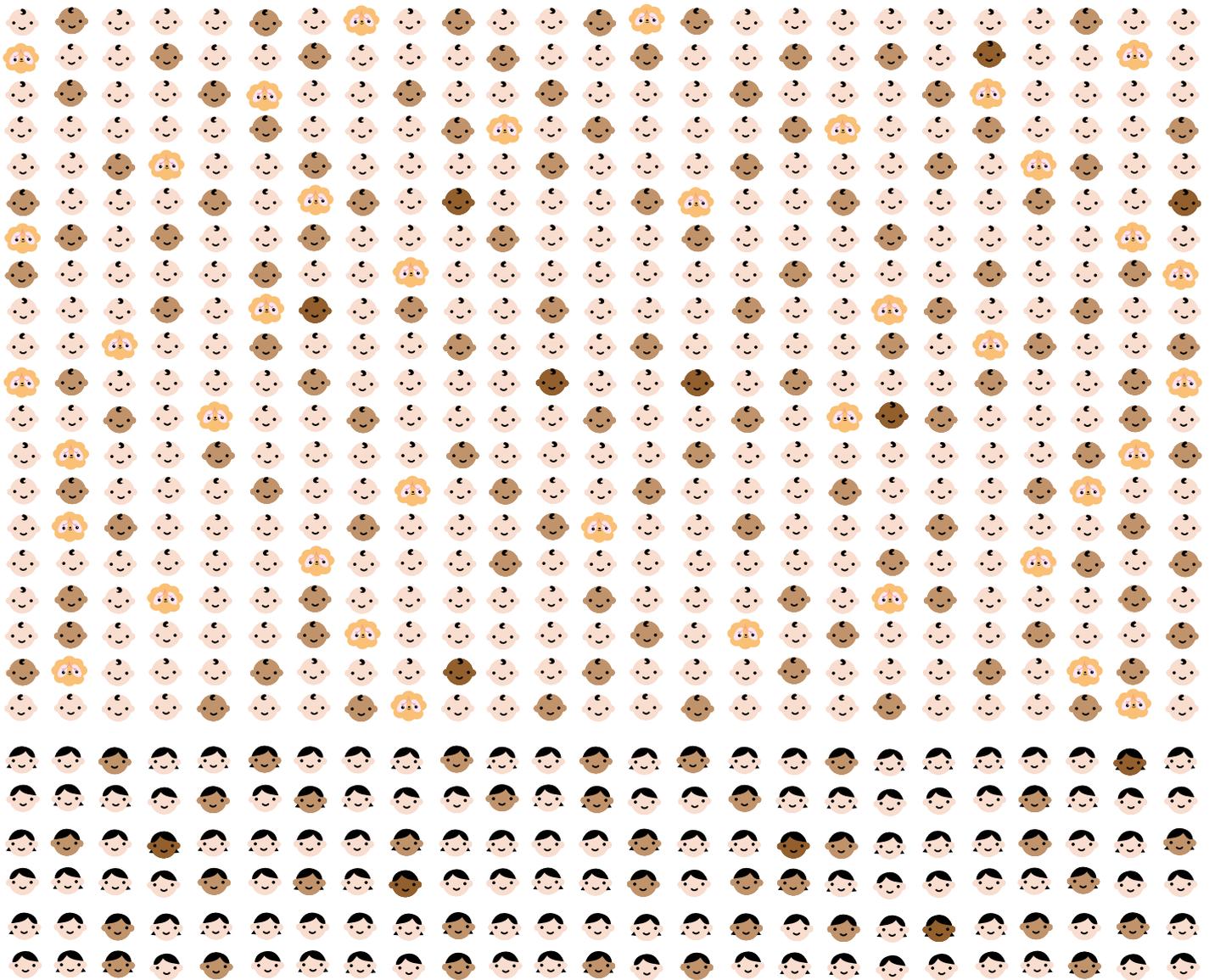
1000 Babies

The Breathing Together researchers can't answer these questions on their own though. To do this research they need the help of 1000 babies and their families. The parents of these 1000 babies kindly allow the Breathing Together team to take samples of cells in the babies' noses when they are first

born, when they are one year old and when they are three years old.

These thousands of cell samples are then used by the Breathing Together scientists to do their research.

There are also 300 older children involved in the Breathing Together research. Some children whose breathing becomes wheezy and have to go to hospital are asked if they would like to donate some cells to the research. Some children who



have operations such as having their tonsils or adenoids removed are also asked if they would like to donate some cells to the research.

The 1000 Breathing Together babies and the 300 Breathing Together children involved in the study are doing something very special. Without them this research to understand asthma would not be possible. It is such important research.

Around one in every 12 people  in the UK has asthma. By understanding asthma better we are taking the next step to better treatments and ultimately a cure for asthma. Understanding asthma better will mean that children in the future have healthier lungs.



breathingtogether.co.uk

About this Book

0 1 2 3 4 5 years

You will need:

An illustrated list of the items you will need for each activity.



Age

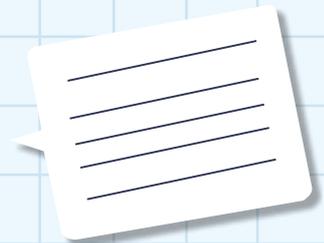
Each activity has a target age. Some activities work across a wide range of ages and some are more specific. These are just a guide and you can assess whether each activity is suitable for your child.

Breathing Together Story

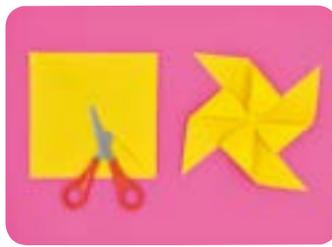
You will see speech bubbles throughout the book from different members of the Breathing Together team, telling the Breathing Together story in their words.



Sejal, London



How to:



In two or more steps this panel will guide you through visual and written instructions on how to complete the activity.

Timings

Approximate timings to complete the activity. These are calculated from start to finish.

15 mins



Safety

When choosing an activity keep an eye out for specific warnings but please follow these general health and safety guidelines for all activities:

- Use your own judgment to consider your child's individual development and abilities when deciding on safe activities
- Avoid activities with small objects if your child tends to put things in their mouth
- Keep your child away from any potentially dangerous tools including sharp scissors and knives
- Choose child friendly, nontoxic paints and other materials
- When setting up activities, be aware of slipping, tripping, choking and strangulation hazards
- All activities are designed for you to do together with your child
- **Always supervise activities**

Science

A science panel will explain the ideas behind each activity and how they relate to the Breathing Together research.



If you would like to share your photos of these activities on social media please use the hashtag **#breathingtogether**

Breath Paintings

Using paper straws and poster paints put some splodges of colour onto a piece of large paper and encourage your child to blow each splodge to create a breath pattern. See if they can blend one splodge into another to create new colours.

You will need:

Paper



Paint



Drinking straws

Top Tip

Watery paint will move quickly across your page so you'll have to use little breaths. Thick paint will need a stronger breath for you to make your artwork.

How to:



Pour a few blobs of paint onto your paper. Two or three different colours.



Blow the paint around the page using a straw.



Merge the colours together and make a masterpiece using your breath!

15 mins



Don't forget to decorate your painting after it has dried. You can add eyes to your shapes to make them into monsters and aliens.



Science

We all started life in our mum's womb with lungs filled with fluid but as soon as we were born the fluid was squeezed out and we had to start breathing air for ourselves.

When we took our first breath, the blood vessels in and around our lungs expanded and the blood flowed to our lungs to collect the oxygen from the air we breathed in.

Blowing Treasure Basket

Take a collection of safe objects such as a feather, a floaty scarf, a paper windmill and some ribbons. Try to pick 'blowing' themed objects that also have a variety of different sensory qualities such as texture, colour and shape. Place the objects in a basket or box. Once you have introduced the treasure basket to your baby, let them explore it on their own and observe what they do.

You will need:

Feather 

Floaty scarf 

Paper windmill 

Ribbons 

Shredded paper 

Top Tip

You can also blow gently on your baby's cheek so that they can feel your breath.

How to:



Sit down together with the treasure basket.



Take an object, describe what it is and show your baby what happens when you blow it.



Let your baby explore the items in the basket.

15 - 60 mins

Science

We breathe air in through our nose and mouth, down our windpipe and into our lungs. The oxygen from the air transfers from our lungs into our bloodstream and the waste gas carbon dioxide is transferred back into the atmosphere when we blow or breathe out.



Breathe to the Beat

Get moving with your little one to give their lungs a good workout and show them how their breathing changes to match the rhythm of a tune.

You will need:

Music with a slow rhythm



Music with a fast rhythm



Try asking your child to count on their fingers each time they take a breath after dancing to the fast music and then the slow music, to show the difference.



Science

The rate and depth of our breathing adapts according to how much oxygen our body needs and how much waste gas we need to get rid of. When we are exercising and using lots of energy, we breathe faster and deeper. When we are moving slowly and calmly we breathe slower and shallower. Exercise is really good for our lungs to keep them super healthy.

How to:



First play the fast music and dance along with your child, encouraging them to move their body in time to the rhythm.



Take a break and notice how you are both breathing.



Next play the slow music and dance along.

Repeat.

It's your own mini disco!

Paper Windmill

A paper windmill is a great way for budding scientists to test and explore the power of breath and air! The stronger your breath, the faster they will spin. This craft is easy enough for an older child to do themselves but they will need supervision.

You will need:

Scissors



Pencil



Ruler



Paper (square)



Drawing pin

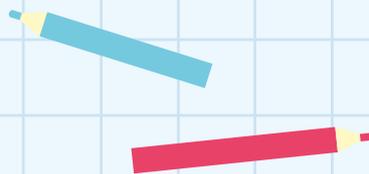


Straw



Top Tip

Get out your colouring pencils and decorate your paper square before folding to make a cool pattern!



How to:



Using a ruler, mark the center of your square paper with a pencil. Draw a line from each corner to the centre.



Use the scissors to cut down your drawn lines. Fold alternating points into the centre dot and put a pin through.



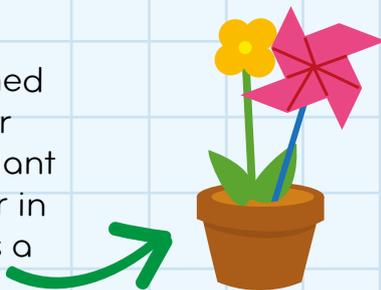
Then push the remainder of the pin through the straw. Use a bit of tape or tac to cover the sharp end of the pin so it is safe for little ones.

15 mins



Top Tip

When you're finished playing with your windmill you can plant it in your garden or in your plant pots as a decoration!



Safety Warning!

Ensure that the drawing pin is well secured and the sharp end is covered.

Science

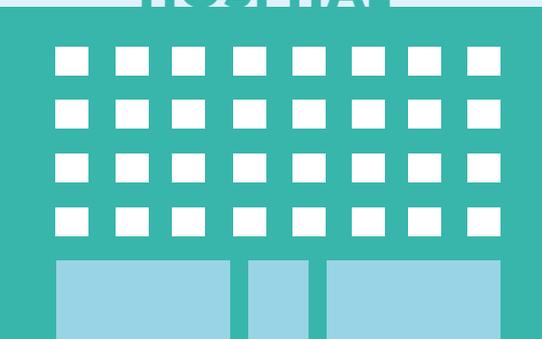
Blowing is a skill that we have to learn, just like walking and talking. We learn to blow raspberries, blow out birthday candles, blow our noses, blow bubbles and eventually we have strong enough blowing muscles and big enough lungs to blow up balloons!



Nicky, Isle of Wight

“As research nurses we meet new parents and invite them and their baby to be part of the Breathing Together study. We visit their homes to fill out a questionnaire and take small samples of cells from their baby’s nose and throat and a few drops of blood. We follow up with each baby at one year and three years and repeat the samples and questions to see how their lung health is developing. If a baby’s breathing becomes wheezy we do an extra visit whilst they are poorly. We have all kinds of families in the study from all walks of life. We hope that our work will lead to better lung health for children in the future.”

HOSPITAL



“It’s lovely to meet the families who are part of the Breathing Together study. I enjoy seeing the children during the visit and playing with them while collecting the samples. A smile before leaving is a bonus!”



Maria, Isle of Wight



Stephen, Aberdeen

“The best thing about working on this study has been the privilege of meeting families in the first days after their baby has arrived in the world and hearing their stories as they grow.”



Head, Shoulders, Lungs and Toes ...

Sing a 'lungs' version of 'heads, shoulders, knees and toes' - just replace knees with lungs!

You will need:

Your best singing voice and enough room to perform the actions!



Have your little one lead the song - once they've got the hang of it!

Head shoulders / lungs



Science

Usually we breathe automatically and we don't need to think about it but we can control our breathing when we want to, such as when we take a big breath between singing the lines of a song. Singing is brilliant exercise for our lungs, making them work really hard and keeping them super stretchy and elastic.



30 mins

Science

Our lungs are one of the largest organs in our body, taking up much of the space inside our chest. They have to be big to take in enough oxygen to reach the tips of our fingers and toes. Our left lung is slightly smaller than our right lung, to allow room for the heart.



You will need:

Balloon
pump
and
balloons



Blowing Balloon Air

Blow air from a balloon onto your baby's skin

Top Tip

You can also play with a balloon pump or paper fan by gently blowing or fanning air onto your child's hand or cheek.



How to:



Take a balloon and sit or lie your baby down in a warm and comfortable place.



Blow up the balloon to different capacities and let the air out of the neck of the balloon near your baby, on their face, arms, chest, tummy.



Try to let the air out at different rates - fast and slowly to vary the sensations your baby feels.

15 mins



Science

Healthy lungs are very stretchy so that they can expand and contract. We need to use our breathing and blowing muscles to draw air in and out of our lungs. When we blow up a balloon we take big powerful breaths and transfer the air from our stretchy lungs into the stretchy balloon.



Safety Warning!

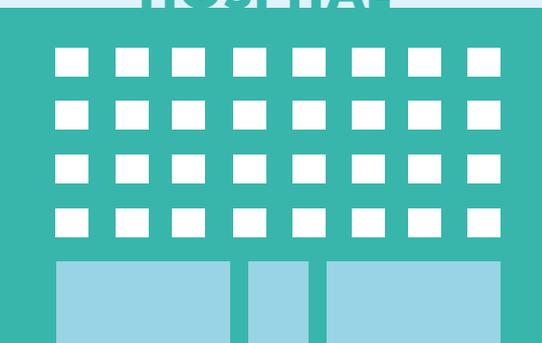
Always clear up balloons after use as they are a choking hazard.



Arlene, Belfast

“I am a research nurse and I work in a hospital where children sometimes have operations such as having their tonsils removed. Before their operations I chat with children and their families about the Breathing Together study and ask if they would be willing to take part in the research. If they agree, I collect samples of cells from the nose and lungs while the children are fast asleep. These cells, along with all of the other samples from the Breathing Together study, are then used by scientists in experiments to understand why some children develop asthma.”

HOSPITAL

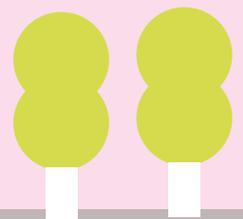


“I am the chief investigator of Breathing Together which means others do the work and I take the credit! As a doctor I have always been interested in respiratory medicine but I started working with children quite late in my career, I have never looked back though – children are much more fun than adults!

I want to tell all of the children and parents who are part of Breathing Together how grateful we are to them. We could not do this research without them and we do not take it for granted. They are helping future generations of children. Prevention is better than cure and we hope that in the future we will be able to prevent children developing asthma rather than picking up the pieces once it develops.”



Andy, London

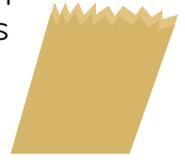


Make a Pair of Lungs

A great activity to help your little scientist visualise how the lungs work inside the body. Make a simulation of a pair of lungs using paper bags and straws. When the 'lungs' are inflated using the straws your child will see how the lungs in our bodies inflate with breathing.

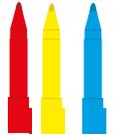
You will need:

2 paper bags



2 drinking straws

Felt tip pens

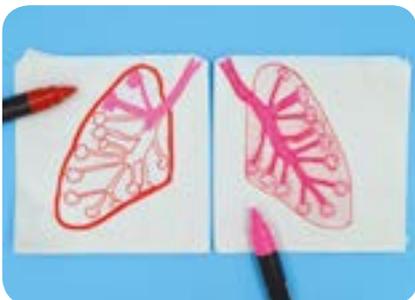


Tape

Top Tip

It's great to use paper straws from a craft shop and masking tape or washi tape so that the 'lungs' can be easily recycled

How to:



Draw the lungs, including branching airways on the paper bags.



Attach the bags to the straws making sure there are no air gaps.



Time to test out your lungs by breathing in and out of both straws at the same time.

30 mins



Get your child to take a deep breath into the paper lungs. What happens? Discuss how the model is similar to human lungs.

Science

Our lungs are amazing. On average, adults take about 25000 breaths every day.

Babies and children take even more breaths, slowing down as they grow up. The surface area of our lungs is enormous to allow for the gas exchange to happen. If the millions of tiny air sacs in our lungs were spread out flat they would be about the size of a tennis court!

Science

When we inhale, the muscle at the base of our chest (the diaphragm), which is normally shaped like a dome, contracts and becomes flatter, pulling air into the lungs. When we exhale the diaphragm relaxes, goes back to a dome shape and air is pushed out of the lungs.

Flower Breath

This flower breath is an easy way to help children become aware of their breath and relax. Find a quiet moment in the day to practice this activity.

Top Tip



This can be a great activity to try before bedtime, helping to relax and wind-down.

How to:



Choose a comfortable upright sitting position such as cross-legged. Close your eyes and begin to focus on the sound of your breath.



Imagine you are holding a flower. Imagine the colour and smell of the flower. Then take in a deep breath, pretending to smell the flower.



Then exhale and pretend to blow the flower petals. Repeat the cycle of a strong inhale and gentle exhale for a couple of minutes.

15 mins





Sejal, London

“I look after children with breathing problems and spend two days a week in the hospital seeing patients and doing bronchoscopies (passing a fibre optic camera into the lungs). I chose to be a doctor because I really enjoy working with people, especially children, and I wanted to be part of the NHS. I think it’s so important that everyone gets the same healthcare no matter what their situation. In my job I do a lot of research to understand breathing difficulties in children. I helped design the Breathing Together study and worked out which children to include. No other study into early wheezing has looked at actual cells so the project has the potential to have huge impact on developing a cure for asthma in the future.”

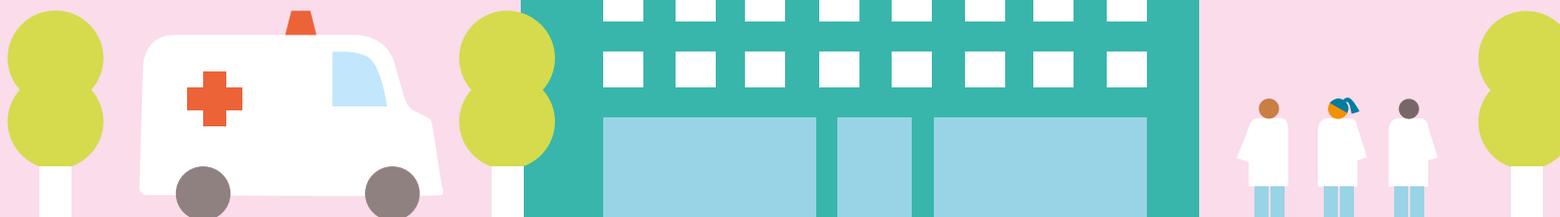


“I am a doctor who looks after children with asthma and I have been involved in research like Breathing Together for about ten years. Breathing Together is fab research because the study could open up a completely new view on how to cure asthma. We know that the cells which line our breathing tubes are different between children with asthma compared to children who do not have asthma. These cells are called epithelial cells, they fit together in layers a bit like cobblestones. We collect these cobblestone-like cells in samples from the children in the Breathing Together study and then do experiments on them. This will lead to a totally new understanding of the role of these cells in causing asthma.”



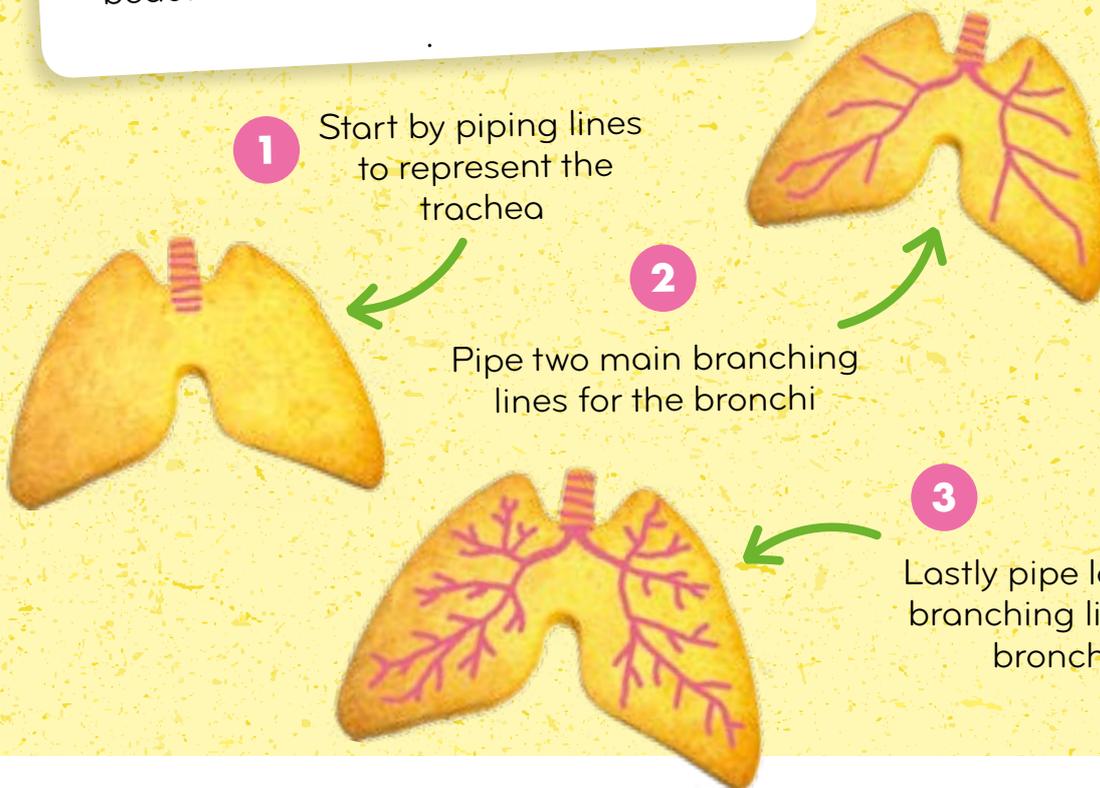
Steve, Aberdeen

HOSPITAL



Bronchial Biscuits

Decorate lung shaped biscuits with beautiful branching bronchioli patterns.



You will need:

250g Unsalted butter 

250g Caster sugar

500g Plain flour

2 Eggs  

1 tsp Baking powder

1/2 tsp Vanilla extract

Baking tray 

Baking paper

Rolling pin

 Mixing bowl

Lung shaped cookie cutter

Coloured icing

How to:



Beat together the butter and sugar then the eggs and vanilla extract.



Sift the flour and baking powder then stir into the butter mixture and work into a dough.



Knead into a ball then leave to chill in the fridge for one hour.

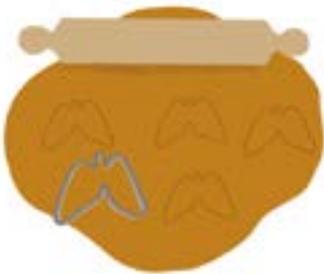
2 Hours

If you can't get hold of a lung shaped cookie cutter, you could make your own or just make square biscuits and draw the outline of the lungs with your icing.



Science

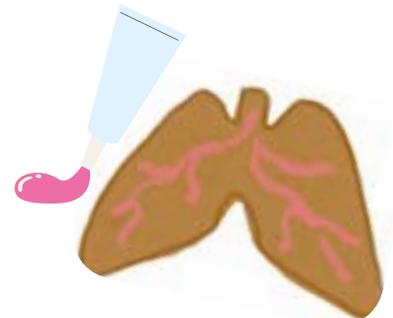
The air that we breathe goes down our windpipe into airways in the lungs. The airways spread out like tree branches into lots of smaller, thinner tubes called bronchioles. These tubes end in bunches of tiny round air sacs called alveoli. The total length of the airways in an adult is about 1,500 miles. Lungs need to have lots of branches (airways) so that they can take in lots of air.



Roll out to 0.5cm thick, cut biscuit shapes out.



Place onto a baking tray lined with baking paper and bake for 12-15 minutes at 170°C.



Once cool, decorate with branching patterns. The more branches, the healthier your lungs are.

You will need:

Your hands!



Baby Signing

Sign language is a great way to communicate with your baby before they start speaking. Some babies can learn simple signs as young as six months old.



10 mins

Science

Sign for Breathe

Raise both hands to your chest with your fingers spread and move them forward and back.



Sign for Lungs

Place one hand on each lung.



Sign for Blow

Put your hand in front of your mouth and move it away in front of you. Start with a closed hand and open it as you move away.



If we look at lungs under a microscope, they are like a giant sponge. This is because they need to have an enormous surface area for gas exchange to happen – oxygen comes into our body and carbon dioxide goes out.

An adult breathes around 12-20 times a minute but a newborn baby takes between 30 and 60 breaths per minute when they are awake. Children have a faster breathing rate than adults because they have smaller lungs and have less space to exchange the oxygen and carbon dioxide.

Looking after young children can be stressful at times. Research has shown that extending your exhale or 'out breath' by blowing gently for as long as possible can aid relaxation.

Make Your Own Bubble Mixture

It's so satisfying to create your own bubble solution in the kitchen. This is a great chance to encourage your child to role play as a scientist and allow them to measure, mix and have great fun with the outcome.

You will need:



1 Cup
of Water

2 tbsp
Glycerin



Pipe cleaners



4 tbsp
Washing
up liquid

Top Tip

Don't worry about getting a bit messy - anything that gets dripped or splashed on will come out sparkling clean after a wash but be sure to clear up any spills that could cause slips and trip.

How to:



Put a cup of water into a bowl, add 2 tablespoons of glycerine and 4 tablespoons of washing up liquid and stir.



Try different 'wands' to blow through and see which ones work best at creating bubbles.



To store your mixture, pour into a bottle with a lid to avoid spills.

30 mins



Use household objects to make different sized bubbles. Try a bendable coat hanger or a plastic funnel. Pipe cleaners bent into a traditional bubble wand shape work really well. You can try cupping your hands together to make an 'O' shape too!



Science

Most children learn how to blow bubbles for themselves when they are between two and three years old. It's great to practice with younger children though as it will help to strengthen their blowing muscles.



Graham, Southampton

“I am one of the people in Breathing Together who takes all the data and analyses it using computer programmes. I am interested in the impact of wheeze and asthma at a population level, this is called epidemiology. I am trying to find out if there are factors in children’s lives that might predict whether they develop wheeze and asthma. I am interested in children’s families, what happens during birth, the environment they grow up in and what children are exposed to in the first years of life - for example whether or not they have pets. We collect these data from questionnaires filled out by the parents of babies and children who are part of Breathing Together. We then combine this data with the laboratory experiments. The way to understand difficult problems is to bring people together with different expertise to tackle the problem from all angles - this is what we are doing on Breathing Together.”



“I was one of the children’s doctors involved at the start of the project and helped bring the team together. I work at the children’s hospital in Belfast, treating patients in the wards and running specialist clinics for children with asthma and other breathing problems. I went into medicine because I was really keen to understand how the human body works. Children with asthma have more ‘twitchy’ airways than normal meaning that when the breathing tubes are irritated (eg with a head cold virus) they are more likely to narrow and produce mucus – causing the child to wheeze and become short of breath. The Breathing Together study is trying to find out why some infants go on to develop wheezing while others do not and it should help us find factors that could help predict which infants are at risk.”



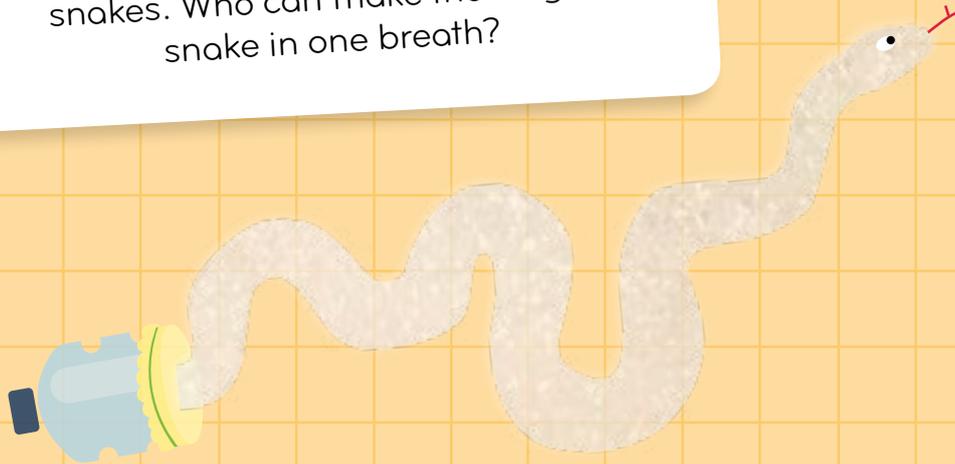
Mike, Belfast

HOSPITAL



Bubble Snakes

Have lots of fun making gigantic bubble snakes. Who can make the longest snake in one breath?



You will need:

Sock or cloth



Plastic bottle

Elastic band



Washing up liquid



How to:



Take a plastic bottle and cut in half, keeping the half that includes the neck of the bottle.



Attach the sock or cloth to the cut end of the bottle using the elastic band. Dip the sock/cloth in washing up liquid and blow through the neck of the bottle to create your bubble snake.



Take one deep breath and see how long you can make your snake.

30 mins



Safety Warning!

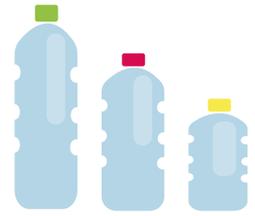
Make sure to warn smaller children not to breathe in!

Science

The maximum amount of air that we can take into our lungs in one breath is called our lung capacity. Exercise, singing and playing wind or brass musical instruments can lead to increased lung capacity.

You will need:

Plastic bottles



Bath Time Bottles

Play with empty plastic bottles in the bath, letting the bubbles out of different sized bottles to discover how much air there is in each one.

Safety Warning!

All water play should be supervised extra closely and never leave a bath of water unattended.

How to:

Empty and clean some bottles



Immerse the smallest bottle under the surface of the water.



Tilt the bottle to let the air bubbles come out and see how long this takes.



Next try with a bigger bottle and count how much longer the bubbles take to come out.

20 mins



Top tip

Use a see-through bottle so that you can see the air trapped inside.

Let your child play with lots of different shapes and sizes of bottles.

Science

The size of our lungs increases as we grow. As a child gets taller their lungs and airways expand to fill the space available in their rib cage. In the first months and years of life a child's lung volume increases rapidly as the air sacs (alveoli) in their lungs develop and increase in number.

Condensation Drawing

Breathe onto a window or a mirror to steam it up and draw something in the condensation with your finger.

You will need:

A mirror



or a glass window



Top tip

A great time to try this is after a shower or bath in the bathroom when the mirror steams up from the hot water.



Try playing noughts and crosses on the window with older children.

Science

When we breathe out, our breath contains water vapour. The inner linings of our lungs are moist and so the air we breathe in picks up water from the surfaces of the lungs. Our lungs are also warm, warmer than the outside air, so air that we breathe in becomes humid which means we can easily create condensation with our breath on cooler surfaces.

How to:



Have your child breathe onto the mirror using a HAAAH sound from the bottom of their lungs.



Now you help them and make as much condensation as possible.



Let your child make some marks in the condensation and watch it disappear.

Musical Glasses

Make some music using glasses filled with water and listen to the different sounds made by different volumes.

You will need:

Glasses



Chopsticks or sticks



Food colouring or ink

Water



How to:



- 1 - Fill your glasses with different amounts of water.
- 2 - Add different colours to each glass (optional).
- 3 - Tap each glass to hear the different sounds they make.

The Science

We all have slightly different lung capacities. Factors such as age, sex, height, and fitness all have an influence on the volume of air we can breathe into our lungs. Our lungs usually reach their maximum capacity in early adulthood (20-25 years) and decline with age from then on.

20 mins

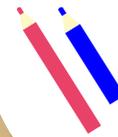
Safety Warning!

Keep glasses in the middle of a table and clear up immediately after use to avoid breakages.



You will need:

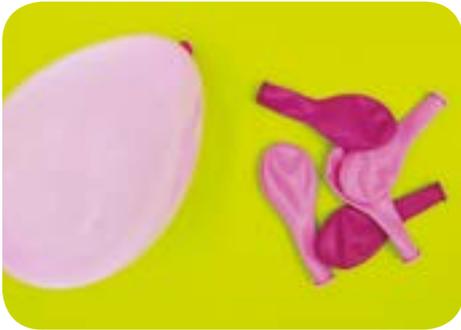
Pink balloons



Blue and red felt tip pens

Balloon Alveoli

Decorate balloons to look like the amazing alveoli in our lungs. When we breathe in, our alveoli fill up with air, just like a balloon.

How to:

Blow up the balloons.



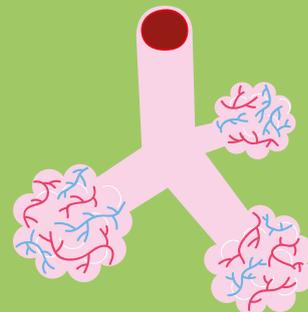
Draw lots of tiny blue and red lines to represent blood vessels on the surface of the balloon.

Caution

Give the felt tip pens a couple of seconds to dry on the balloons surface before you let it touch your clothes or other fabrics.

Science

Inside our lungs are millions of tiny air sacs (alveoli). There, the oxygen from the air we breathe in is transferred across incredibly thin walls into tiny blood vessels called capillaries. Our waste gas, carbon dioxide, is transferred in the other direction ready to be breathed out.



Safety Warning!

Always clear up balloons after use as they are a choking hazard.

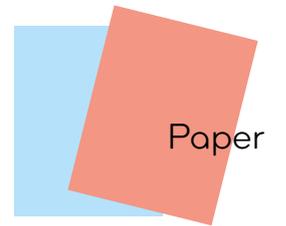
15 mins



Caterpillar Racing Game

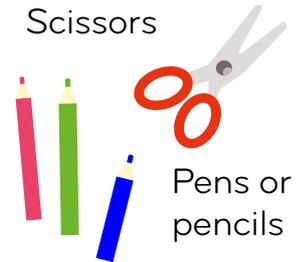
Cut, fold and decorate a caterpillar shape for each player. Make a starting line. Using straws, each player blows the caterpillar, the first to the finish line wins.

You will need:



Paper

Scissors



Pens or pencils



Drinking straws

Top Tip

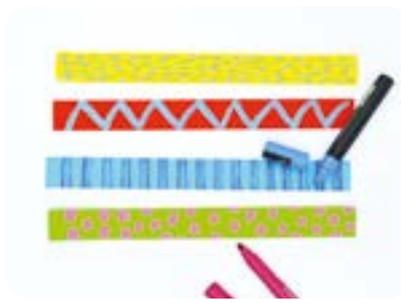
Decorate your caterpillars with different designs. Try making worms and snakes too.



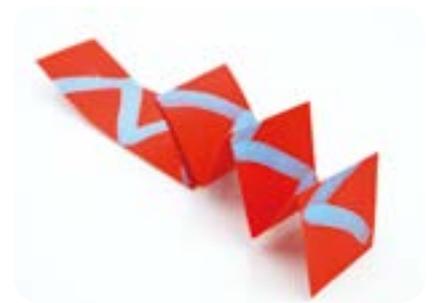
How to:



Cut your paper into a strip about 2 cm thick.



Design the pattern of your caterpillar.



Fold your paper back to front in a concertina fold.

15 mins

Test your breath even more by making an obstacle course for your caterpillar. Recycle some cardboard for the perfect building material.

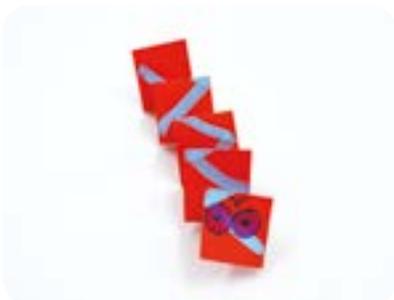


Science

Our brain is constantly detecting the amount of oxygen and carbon dioxide in our blood. It sends signals to our breathing and blowing muscles to let them know how hard and fast to breathe depending on how active we are. This maintains the correct oxygen and carbon dioxide level in our blood. If we get out of breath playing a game then we will continue to breathe faster until we have recovered from our exertions! Breathing fast is also a way of blowing off any excess carbon dioxide in our blood.

You can use tape on the ground or the table to make a start and finish line!

Finish



Unfold and get your caterpillar ready in position to race!

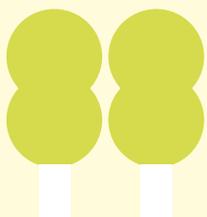


Use a straw and blow to get your caterpillar moving.



Ellen, London

“I help to run a programme of creative activities and events for under fives and their families all about breathing and lung health (which this activity book is part of). I work with OKIDO and the nurses, doctors and scientists from Breathing Together to develop fun ways to engage young children with breathing and the lungs. I have a two year old daughter so developing creative activities for under fives is very useful for life at home too! It has been such a rewarding experience to develop an understanding of how babies and young children play, explore and discover the world around them.”



“I work at OKIDO and OKIDO is the public engagement partner for Breathing Together. OKIDO is a world where children can discover science, have fun, learn through play, stories, activities and games. We make a science and art magazine for children aged 3 to 7, a TV show called Messy Goes To OKIDO on CBeebies and lots of workshops and live events. With Breathing Together, it’s amazing to work on a long project and create activities for children and their families from birth until they are five. It’s also very interesting to work with all the different people doing the research to see how they work together and how they communicate what they are doing.”



Sophie, London



Cell Cakes

Make tasty chocolate rice crispy treats to represent the cells that line our lungs and airways. Add a gooey layer of chocolate on top for the mucus that our lung cells secrete.

Top Tip

You can try adding a few drops of food colouring to make the cell cakes different colours.



You could even add sprinkles to represent cilia.



You will need:

100g Unsalted butter



150g Rice crispies



100g Marshmallows

100g Milk chocolate



Baking paper



Baking tray



Large pan



Bowl



How to:



Grease a tin and line with baking paper.



Melt the butter, and marshmallows over a low heat.

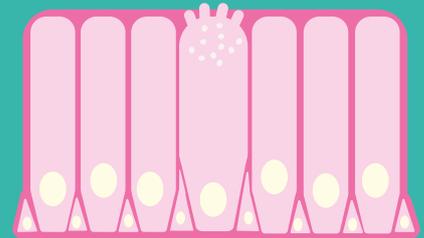


Stir until fully melted then mix in the rice crispies.

1 Hour

Science

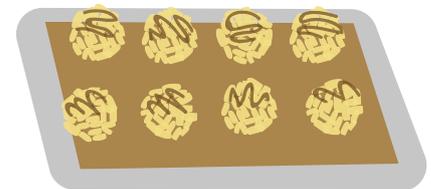
Epithelial cells create the barriers between the inside and the outside of our body. They form our skin and line our throat, intestines and our airways and lungs. Take a look at your hand, you are looking at millions of epithelial cells! Epithelial cells are packed tightly together to form a protective barrier and in our lungs they produce mucus to trap particles from the outside environment.



Roll or mould the mixture using your hands into golf ball sized balls.



Melt the chocolate in a bowl in the microwave. Then with a spoon drizzle over your cells (balls).



Let them set by popping in the fridge to harden - and then enjoy your cell cakes.

Make Your own Mobile

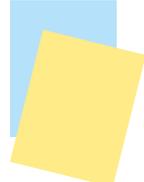
Make a mobile for your baby using a wire coat hanger. Stretch it open into a circle shape and wrap colourful tissue or crepe paper around it. Then hang different lengths of coloured wool from the hoop and add some lightweight, colourful shapes.

You will need:

Coat hanger 

Crepe paper 

Wool 

Card 

Scissors 

Tape 

Safety Warning!

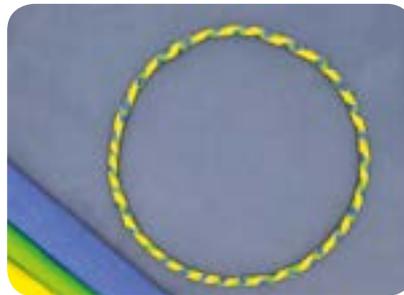
You can hang this over a cot or carry basket but make sure to keep it out of your baby's reach.

Snip off the hook end with some pliers or wire cutters.

How to:



Start by stretching your wire coat hanger open and into a circle.



Wrap the wire with colourful tissue or crepe paper.



Hang from it six different lengths of wool.

40 mins

Science

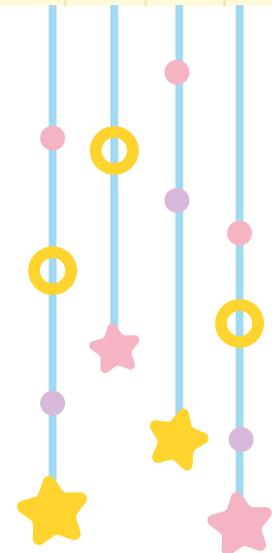
Breathing exercises can keep our lungs stretchy and supple, make them more efficient and help us to relax. When blowing your baby's mobile try taking a deep breath through your nose and letting it out through a tiny gap between your lips making your out breath out as long as possible. Imagine your breath is a ribbon travelling across the room.



Cut from thick card some colourful shapes of your choice.

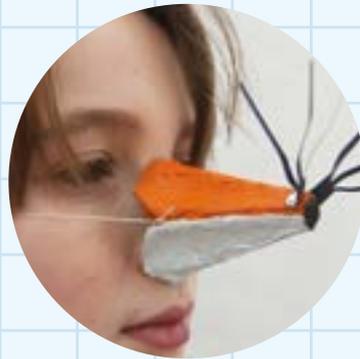


Tie or tape them to the strands of wool.



Make a Nose

Make a collection of animal noses with your child from an egg box and discuss how amazing their own nose is.



You will need:



How to:



Cut the egg box into sections. You can use both the shallow and pointy parts for different animals.



Paint each nose and when dry, draw on details such as nostrils and teeth.



For animals with whiskers, use thick paper to cut them out. Then glue them onto the nose.

20 mins



Prick a hole on each side of the nose. Thread the string through and tie it in a knot.

Science

We may not think of our nose and our lungs as very similar but they are all part of the respiratory system. Our nose is like a guardian for our lungs, keeping out dirt, allergens and bacteria. This makes it the dirtiest organ in the body! Have you ever noticed black or brown snot after being in a particularly smokey, dirty or dusty environment?

0

1

2

3

4

5

years

Slime Snot

Make some slime and have fun playing with it pretending it's some mucus.

Safety Warning!

If you or your child have sensitive skin or eczema then use gloves when handling the contact lens solution as it can cause an allergic reaction.

You will need:

Mixing bowl



100ml PVA glue

1/2 tsp Bicarbonate of soda



Drop of green food dye

1 tsp Contact lens cleaning solution or other slime activator



How to:



Squeeze the glue into a mixing bowl. Add the bicarbonate of soda and mix well.



Add the green food dye and mix until well incorporated.



Add the contact lens solution and mix. The slime will be stringy before coming away clean from the bowl into a ball.

20 mins

Science

Snot is a type of mucus. We have mucus in various bits of our body to protect us from the outside environment. In the lungs mucus (or phlegm) protects us from smoke, pollution, pollen and all kinds of other tiny particles that we might breathe in. Snot is what we call the mucus that comes out of our nose. It can sometimes feel like a baby or toddler's nose is constantly full of snot!



Once it has formed, take it out and knead it with your hands until it is smooth and not sticky.

All slimes are made by mixing PVA glue with an 'activator'. This activator must be something that includes some borate ions (electrically charged molecules).

Check online for all the current activators available in the UK that work - be aware that something that worked at one time may have its ingredients changed by the manufacturer and will not work at another time. In the US they use liquid starch and Borax, but these are not commonly found in the UK. A couple of own-brand laundry tablets and a few branded contact solutions do work but remember to always check the ingredients list for Boric Acid or Sodium Borate.

Sneeze Art

Make amazing art with splatter and spray patterns while investigating how far and fast a sneeze can travel.

You will need:

Clean spray bottle



Water



Large paper



Tape

Paint



30 mins

Now is a great time to teach your child to cover their nose and mouth when they sneeze to avoid spreading germs. By far the best method is to sneeze into the crook of your arm, avoiding sneezing into the hands, which can spread germs when touching other people and objects.

Science

A sneeze can travel up to 100 miles an hour! Which is why if we are not careful, a sneeze can easily spread colds and other viruses between people. It is our body's way of getting rid of something in our nose that shouldn't be there.

Top Tip

Have fun with your kids making big "Achooo!" noises as you make your sneeze art!

How to:



Fill the spray bottles with different colours of watered down paint.



Tape the paper to a vertical surface such as an easel or a wall or fence in the garden.



Spray your colourful 'sneezes' all over the paper making beautiful patterns.

Cellular Printing

Print colourful repeating patterns that look like the layers of cells lining our lungs.

Top tip!

Try making different cup stamps for different colours and let your child mix colours on the paper by printing one over the other. You could use your cellular stamps to make beautiful wrapping paper for packaging a gift.



You will need:

Paper cup



Bubble wrap

Elastic band



Poster paint



Paper

How to:



Cut a piece of bubble wrap larger than the top of your cup.



Put the bubble wrap over the end of your cup and secure it tightly with a elastic band.



Spread a large piece of paper onto the table and pour different colours of paint into flat containers (such as paper plates or the lids of plastic tubs).

The Science

Epithelial cells are packed tightly together. In our lungs and airways, the top surface of the layer of cells is exposed to the air that we breathe in and this surface is covered with many tiny hairs called cilia. The cilia push mucus and other particles along and out of our lungs.



15 mins



Let your child dip their cup into the paint and print marks onto the paper.



You will need:

Clear
balloon



Paper confetti
(you can make
this yourself by
cutting up
paper)

Beautiful Bacteria Balloon

Fill a clear balloon with coloured paper confetti and have fun playing with it with your baby. Bounce it in the air, look through it and squash your face against the balloon to make your baby laugh, shake up the confetti and listen to the noises it makes.

Safety Warning!

Always clear up balloons after use as they are a choking hazard.

How to:



Fill the balloon with paper confetti before you blow it up.



Blow up the balloon and show your baby how the paper whooshes around the inside of the balloon with the force of your breath.



Play with the balloon together and explore how the paper confetti moves.

15 mins



Even very small babies can enjoy the sensation of the balloon's movement by tying a length of ribbon or string to the knot and allowing your baby to grab it and make the balloon move.

Science

As soon as we are born and take our first breath, our pristine new lungs are exposed to all the microbes that are in the air and those from our mum during and after birth. These microbes are nothing to be frightened of, they make a home in our lungs and help to keep us healthy. They are called the lung microbiome.

Neutrophil Finger Painting Game

Turn messy finger paint art into a game while investigating why our snot changes colour when we have a cold or virus.

You will need:

Yellow and blue paint



White paper



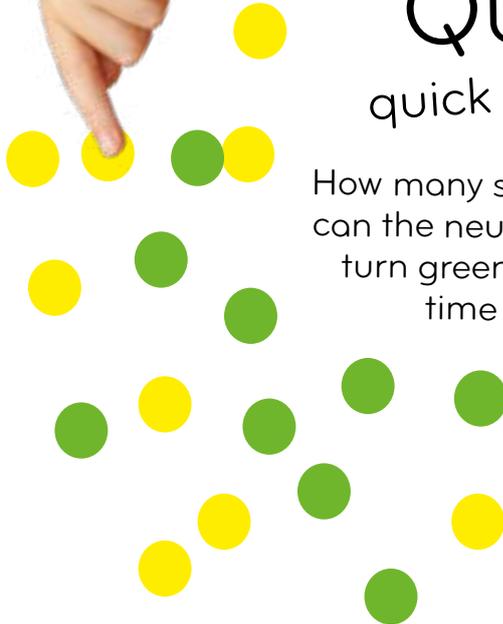
15 mins

Science

When we get a cold or a virus our snot will change colour from clear or whiteish to yellow and green. This is because our immune system sends lots of white blood cells called neutrophils to swallow up the bacteria and viruses. The neutrophils secrete molecules that turn our snot yellow or green when we are poorly.

Quick quick quick!

How many snot splodges can the neutrophil finger turn green before the time is up?



How to:



Take a piece of paper and ask your child to use their finger to put a collection of yellow and blue splodges on it.



Next explain that if a fingerprint of yellow paint is added to a blue splodge or if a fingerprint of blue paint is added to a yellow splodge then they will turn green.



Start a 20 second timer and count to see how many yellow fingerprints your child has turned green by the end.

Nostril Tube

Play this fun cardboard tube game and show how the snot inside our nose traps dirt and germs to keep our lungs clean.

You will need:

Kitchen Roll



Wooden skewers or tooth picks



Objects to drop such as:

Marbles



A penny

Small sweets

String

Raisins/seeds or any other household items

Safety Warning!

Always clear up marbles and small objects after use as they are a choking hazard.

Top Tip

Use colourful tape or coloured markers to decorate your tube.

This is a great opportunity to explain to your child how important it is to keep the snot in their nose and not pick it out!

How to:



Stand the kitchen roll tube up vertically.



Push the skewers all the way through the tube at various points to provide some obstacles.



Explore dropping different objects through the tube and see what happens.

15 mins

Try different sized objects to see how larger things are more easily trapped



Science

Our snot lines our nose, trapping dirt and bacteria, cleaning the air that we breathe to protect our lungs. We might think of our snot as disgusting gunk to get rid of from our nose but actually it is doing a very important job, filtering out bits from the air that we shouldn't be breathing in. The nose also helps to warm and moisten the air that we breathe so it is gentler on our lungs.

Notice how different objects fall through at different rates and are affected by the obstacles.

Mucus Messy Play

Create a disgusting collection of snot and bogies, each with a different colour and texture. Let your child get messy exploring the different sensations.

Messy Party

This would be a great activity for a baby get together! Put some plastic on your floor and have the ingredients in different containers to explore.

You will need:

Green and yellow food colouring



Cooked spaghetti

Water



Jelly

Corn flour



How to:



Gather your different messy play ingredients and use the food colouring to make them look extra 'mucusy'.



Set up your messy play session. You could do this in a paddling pool in the garden or on a tray at the table.



Encourage your child to get stuck in and observe how they explore.

30 mins

Science

We have all experienced the different colours and textures of snot. Some days we feel like our nose is a leaky tap that won't stop dripping. And some days we feel all gunked up with dry, thick or sticky bogies. Healthy phlegm should be watery but infections or being dehydrated can alter the texture.



Make Meringue Microbes

Try this simple recipe to make meringue microbes which are fun to eat and decorate with kids. Help your child learn about the role of microbes in the lungs.

You will need:

3 Eggs



200g
Caster sugar



Assorted
decorations

Mixing
bowl



Electric
whisk

Baking
tray



Pre-heat

your oven to 120°C

How to:



Separate the egg white from the egg yolk.



Whisk the egg whites until they are foamy. Start adding the sugar a spoon at a time.



When the mixture is stiff and shiny, stop whisking. Scoop up the meringue with 2 spoons.

1 Hour

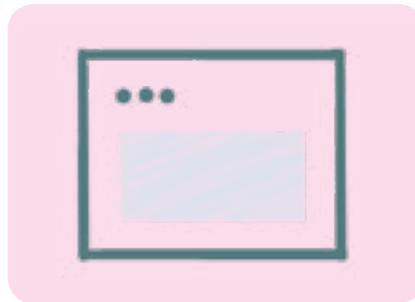
Science

It is important that we have lots of different kinds of microbes living in our lungs to keep us healthy, including bacteria, fungi and viruses. If any one species takes over more than it should then it can lead to an infection. But if we have lots of diverse species of microbes then they will keep each other in a healthy balance.

You can make the meringues look like microbes by adding food colouring, cake decorations and chocolate sprinkles. Swirl in cocoa powder and freeze dried raspberries for different flavours!



Put the blobs of meringue on a greased baking tray. Spike up with the back of a spoon. Decorate. ●●●●



Bake in the oven for 30 mins, then turn off the oven and leave the meringues inside until cool.

Squidgy Cell

Make this wonderfully tactile, sensory cell for your baby or toddler to play with.

You will need:

Strong zip lock bag



Washing up liquid

Small objects to add texture such as:

Buttons



Water beads



Frozen peas

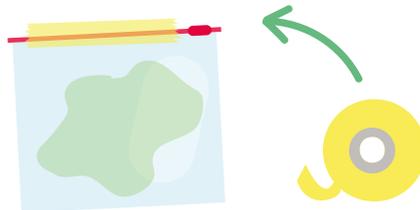


Pom poms



Tape

Make sure you tape around the edge of the zip lock bag!



How to:



Take a zip lock bag and pour washing up liquid inside - enough to be able to 'squidge' around.



Drop in a few tiny objects to add some texture. Tape the edge of the bag.



Have your child explore the feeling of the mixture move around in their hands.

Science

If you look at epithelial cells under a microscope, you will see they have a cell membrane all around the outside and a nucleus in the middle, just like other cells in your body.



15 mins

Safety Warning!

Closely supervise this activity to ensure children do not put the bag in their mouths.



You will need:

Sock



Pens

Paper



Germ Gobbler

Make some germs for gobbling and turn your hand into a germ gobbling macrophage!

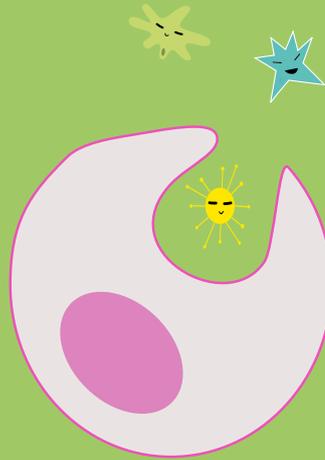


Have fun with babies and toddlers by having your germ gobbler search behind their ears or between their toes for germs to gobble.



Science

Macrophages are part of our immune system and are our biggest type of white blood cell. The name macrophage actually means “big eater” in Greek. They clean up our lungs, eating infected cells and bacteria, removing any invaders that shouldn’t be there.



How to:



Make some germs out of crumpled up paper and decorate them with different patterns or faces.



Put a sock on your hand (or your child’s) - make a greedy mouth by opening and closing your hand and make munching gobbler sound effects.



Play eating all the germs from a table or the floor. How many will fit into your Germ Gobbler’s mouth at once?

Glitter Germs

Show your child how easily germs can be spread from person to person and how well we have to wash our hands to get them clean. Experiment with watching how the glitter moves and where it ends up when you open doors or touch taps. How easy is it to wipe and wash off?

You will need:

Hand
lotion



Paper
towels

Biodegradable
glitter or you
could use
cinnamon



Germs can enter our
body through our
nose.



30 mins

Science

When taking care of children under five we can sometimes feel like they go straight from one cold or illness to the next. It's easy for bacteria and viruses to spread between little ones when they are playing with the same toys at nursery, playgroup or at parties. Washing our hands is the best way to stop the spread of the germs that make us sick.



This is a good activity to do with a small group of children or with the whole family.

How to:



Put a drop of lotion on everyone's hands and have them rub their hands together to spread.



Sprinkle a small amount of glitter in everyone's hand. Make a fist and press your hands together to see how the glitter moves.



Try wiping your hands with a paper towel. Try using soap and water to wash your hands.

Good Bugs Bad Bugs Running Game

A great outdoor game for a group of children or grown-ups and children to play together.

You will need:

 Coloured pens

Large paper



Good weather and energy!

Top Tip

If you are feeling competitive then the last to arrive is out and the winner is the last player left in. Otherwise, just keep running and racing!

How to play:



Make a selection of good bugs (with smiley faces) and bad bugs (with grumpy faces). Make them large enough and colourful enough so that everyone can see them clearly.

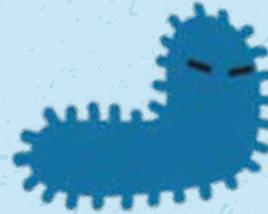
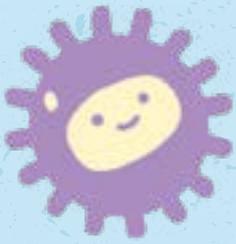


Go into the garden or to the park and place the bugs in different places.



Have all the players start in the middle and call out "good bugs" or "bad bugs" and have the players race to get to them.

30 mins



Draw BAD bugs like us on paper and cut them out

Draw GOOD bugs like us on paper and cut them out



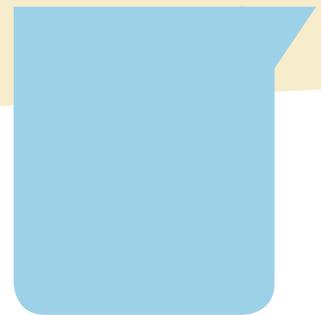
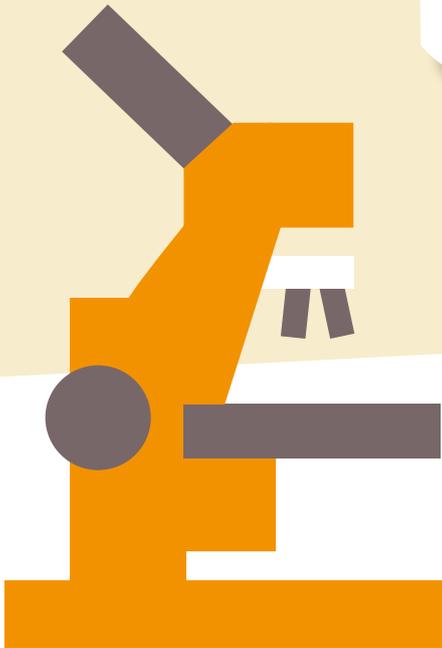
Science

Until fairly recently scientists actually thought that our lungs were sterile, without any bacteria living in them, but in fact we now know that there are many many species living there. New techniques that involve collecting samples of the lung microbiome and identifying (sequencing) the DNA (genetic code) of the bacteria means that researchers are learning lots of new things about the role of microbes in the lungs.



Lindsey, Belfast

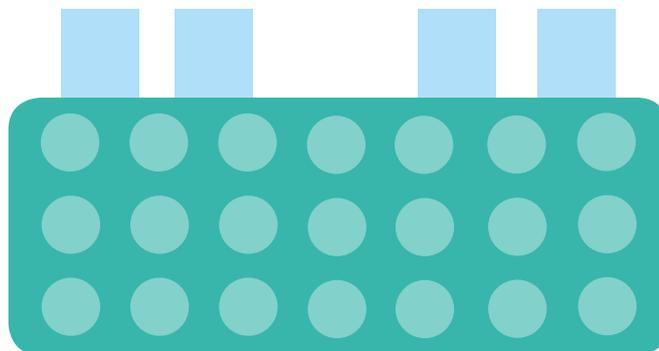
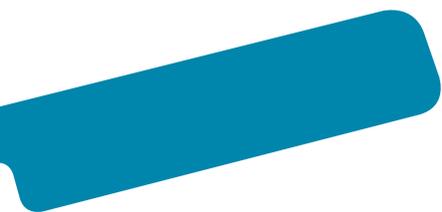
“My job in Breathing Together is to do experiments in the lab. The research nurses send us the samples that they collect and I grow the cells so that they multiply lots of times, giving us plenty for our experiments. Most of my days begin with feeding the cells - they are always hungry! As well as doing experiments, I also spend a lot of time reading work by other scientists to get ideas and to see what has already been done. I love my job because the idea of being the first person in the world to do an experiment and discover something new is so exciting. Four people in my family have asthma so this research is really important to me.”



“I am a scientist investigating the role of the microbiome in the development of wheezy breathing and asthma. We all have lots and lots of species of bacteria and other microbes, such as fungi, living in our noses and lungs. Many of them help to keep us healthy but sometimes they can cause infections. I am doing experiments to try and understand the interactions between microbes and the immune system in the airways and the lungs of young children. I am able to find out about the different species of microbes present in samples by sequencing their DNA. This leads to lots and lots of data so I spend much of my time crunching numbers and analysing them using statistics. I am convinced that the Breathing Together research will shed light on this important aspect of how asthma develops.”



Celine,
Melbourne,
Australia



Snot Smoothies

Make snot coloured fruit smoothies that are simultaneously yummy and yucky! Experiment with combining different ingredients in your blender to make smoothies with different tastes, textures and colours.

You will need:

Spinach



Banana



Some of these:



Peanut butter



Peach



Kiwi



Pitted date



Coconut milk



Pineapple

Blender



15 Mins



The Science

Even when we are healthy our lungs produce quite a bit of mucus every day.

Sometimes it might come out in coughs and sneezes but mostly we just swallow it, we usually don't notice and it doesn't do us any harm.

How to:



Place your ingredients in the blender and whizz up. Use milk to alter the consistency if you need to.



Make a few different versions with different combinations of ingredients.



Hold your snout tasting experience! You could make a snout colour chart from clear to bright green!

Science

Researchers have found that children who grow up on farms are less likely to get allergies, including asthma. This may be because they are exposed to a wider range of different microbes that help to train their immune systems not to overreact.

A Visit to the Farm

Take a trip to a farm to see the animals. What can you spot? Cows, sheep, goats, hens, ducks, geese? What other animals do you see?





Make the noises of the different animals together. You could practice by singing “Old Macdonald Had a Farm” on the journey there and back.

Safety Warning!

Ensure everyone washes their hands after stroking the animals.



A Visit to the Farm Story

How to:

Draw animal faces on your fingers and show them as you discover them in the story.

Read this story and enjoy making all the animal sounds as they come along.



City Farm Day!



It's welly boots day! Hurry up!
It's City Farm Day!

"Quick, the ducks are waiting for us"
shouts Lina happily.

"And the chickens, the pigs, the sheep
and, and... all our friends" adds Lino,
busy putting on his red boots.

Soon the children open the old farm gate.
"Sniff, it smells like the countryside" exclaim
the children taking a nice big breath.



"Hello chicken", says Lino!

"You'd better speak chicken, it's much more
polite," Lina whispers in Lino's ear.

"Talking chicken? Really? Do you talk
chicken?" he asks Lina.

"**Cluck cluck cluck**" answers Lina.

"**Cluck cluck cluck**" the chickens cluck back.

Can you talk chicken too? Have a go.

CLUCK CLUCK...

“It’s time to go to the stable” says Lina.

“Good morning Martin!” say the children as they go into the little donkey shack, carrying two big bales of straw on their heads.

“**Hee-haw,**” Martin the donkey brays back with joy. “Come and relax, it’s warm and dry over here” he brays.

Lina and Lino sit down on a comfy bale near their long-eared friend.

“Hee-haw, I am going to sing you a song. A long, long song” he brays.

“**Hee-haw hee-haw...**” sings Martin, the little donkey.

“Thank you Martin but your song is a bit too long, sorry we have to go” say the children leaving quickly and holding their ears.



Can you bray like a Donkey?
Have a go.

**HEE-HAW HEE-HAW
HEE-HAW HEE-HAW**





“Oh oh! I felt a drop of water on my nose” says Lino, looking up at the grey clouds.
“Looks like it’s going to rain.”

“**Quack quack!**” he says to the ducks floating on the pond.

“You’re going to get wet, you need an umbrella”

“**Quack, quack,**” the ducks quack back. “We like to be wet, but we would very much like it if you could give us our breakfast, quack, quack.”

“Ok, here you go, quack, quack” answer the children pouring the duck’s food into a large tray.

“**Quack, quack,** means thank you quack the happy, wet ducks.

Can you speak duck too? Have a go.

QUACK QUACK...

“Phew! The rain has stopped, but, what’s that?” asks Lino. “Is it a cloud that’s fallen on the grass?”

“Ha, ha, ha, open your eyes Lino, it’s Fluffy the woolly sheep” laughs Lino.

“Baa-baa,” the sheep bleats back, lazily nibbling a blade of grass.

“**Baa -baa**” answer the children.

Can you bleat too? Have a go.

BAA-BAA BAA-BAA





At the top of the field they can hear the cow mooing.

“**MOO, moo, moo, moo**” moos the cow to say hello.

“Moo to you too” answer Lina and Lino loudly.

Can you **MOO** too? Have a go.

MOO MOO MOO MOO

“**Oink oink! Oink oink!**”

Oops it’s the pig calling for his food! Quick, the children run to the pig’s hut jumping and splashing through the puddles, carrying a big bucket full of vegetables.

“**Oink oink**, thank you” oinked the pig, rolling in the mud happily.

“**Oink oink**, you’re welcome” answer Lina and Lino.



Can you oink too? Have a go.

OINK-OINK OINK-OINK

“Ding-dong!” rings the town hall bell nearby.
“Oh, it’s already time to go home” says Lina.
“Bye, bye,” say the children, carefully closing
the old farm gate and waving goodbye to all
their animal friends.

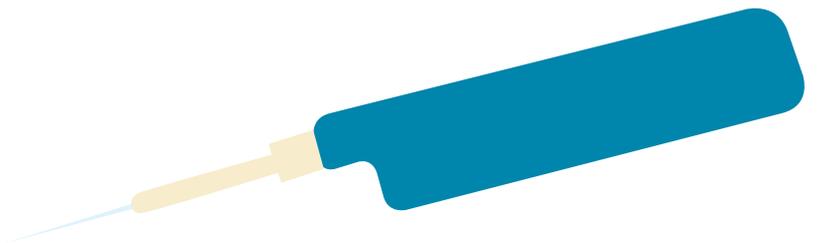
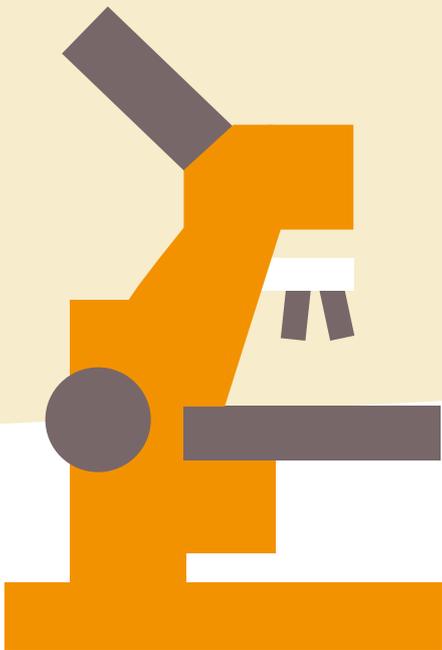
“CLUCK, QUACK, HEE-HAW, BAA, MOO, OINK,
see you soon”, the animals answer together.





Clare, London

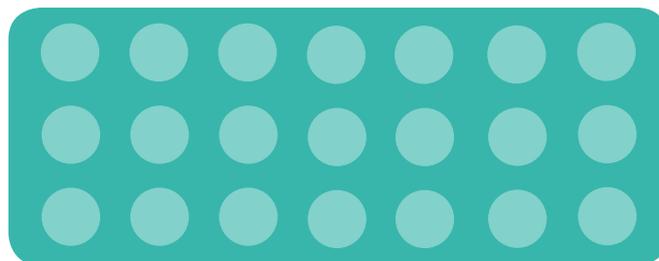
“I am an immunologist working on the immune system in the lungs. I was one of the people who designed the Breathing Together study and applied for the funding. I am responsible for the science direction, for staying on time and on budget and for making the most of our discoveries. We don’t understand how immunity and the lungs develop in babies. We want to know what is healthy development and what isn’t. This underlying question is fascinating and I like thinking about how to design experiments to answer it – which can be hard when working with babies! I have two kids and one of them was hospitalised when really young with a respiratory virus so I understand how scary that can be for parents. Through doing this research we want to promote lifelong lung health for all children.”



“I am the project manager for Breathing Together. My main role consists of day-to-day management of the study ensuring that the study is completed on time and within budget. That being said, I also step in where needed so this might mean that sometimes I’m in the lab working with cell cultures or I might be in the clinic helping out with a follow-up visit with participants and their families. I have really enjoyed getting to interact with some of the families on the study! It’s very different (and refreshing) from my previous years being stationed at the laboratory bench. I’m also the main person behind the social media channels (which I am kind of new to using) so be sure to log on and let us hear from you!”



Mindy, London



You will need:

Plastic or paper cup



Pom poms

Balloon



Scissors

Pom Pom Shooter

Make this fun paper cup shooter and invent games to see how high you can shoot pom poms into the air.

Top Tip

Try experimenting with different sized pom poms, scrunched up bits of paper, ping pong balls, tin foil balls or any other small, light objects you can think of.

Safety Warning!

Always clear up balloons after use as they are a choking hazard.

How to:



Carefully cut off the bottom of your paper cup. Now cut the top from your balloon and tie a knot in the neck.



Stretch the balloon over the bottom of the cup so that it's a snug fit and pop a pom pom (or a few!) into the cup.



Pull the balloon knot and release quickly to 'fire' the pom pom's into the air.

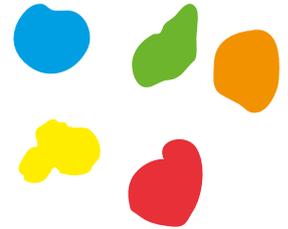


Science

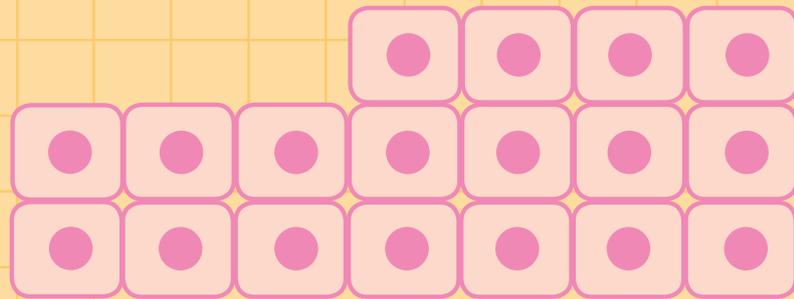
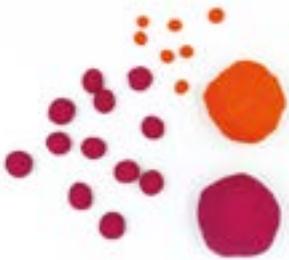
Coughing is a natural reflex and is our body's way of quickly getting rid of irritants from our airways and lungs. Like a sneeze, the air expelled by a cough can travel up to 100 miles per hour!

You will need:

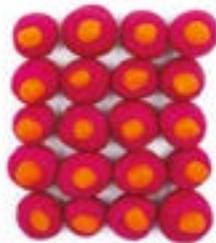
Playdough in different colours

**Playdough Cells**

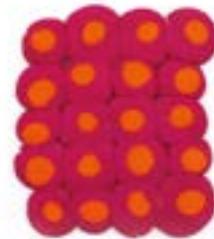
Make a layer of playdough cells packed tightly together, just like the cells in our lungs. What could you make with your cell layer? What shapes can you bend it into?

**How to:**

Roll the playdough into balls of roughly the same size.



Place the balls next to each other and squish them flat so that they connect together like cobblestones.



Try making a layer of squished-together balls that you can hold up. Can you see any small gaps that could let tiny molecules through?

15 mins



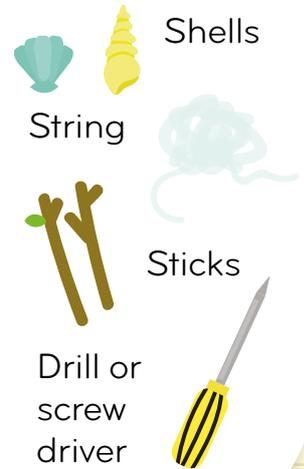
Science

The layers of epithelial cells that form our air sacs (or alveoli) are only one layer thick so as to allow molecules of oxygen and carbon dioxide to pass through. The way they are all connected together makes them look a bit like cobblestones.

Nature Wind Chimes

Make wind chimes using natural objects found on a walk to the park, beach or countryside. Pick up small objects with some weight to them such as pebbles, sticks, conkers, seedpods and shells. String them on a thin twine and hang them from sticks. Place outside a window or door and let the wind move them to make a sound.

You will need:



Top Tip

This wind chime can be created using found objects from a day trip or holiday, making a beautiful 'memory chime'.

How to:



Gather a selection of shells or small objects from nature and find a stick or piece of drift wood to hang your objects from.



Lay the smaller objects into five lines coming vertically from the stick. Drill holes into the shells if they do not have one already.



String the columns of shells together using thin string or wool or, better still, clear fishing twine.

30 mins

The Science

Our lungs are our only internal organ constantly exposed to the outside environment. Sometimes we breathe in air that includes tiny particles like pollen and dust that can cause problems for our lungs.

Top Tip

You can add colourful beads, buttons or feathers too!



Secure each string of shells onto the stick or drift-wood.



Tie some string to each end of the top stick to hang from your child's window.



Listen to the sounds the wind chime makes in the breeze.

Safety Warning!

Any use of dangerous tools like drills should ideally be done in advance before getting children involved. Be sure to hang your wind chimes out of reach of children.

You will need:Glass
of water

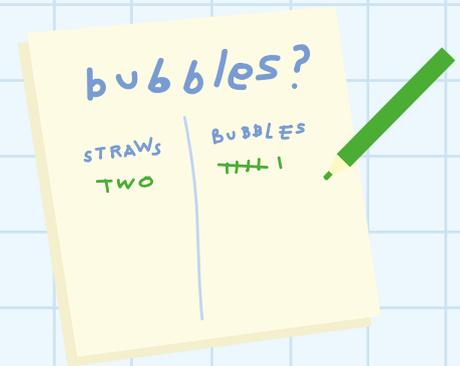
Drinking straws

Blowing Bubbles Through a Straw

Challenge your lung skills by blowing through different sizes of straws into a glass of water. Is it easier to blow through one or more straws?

Record!

Write down your results in a book.



How to:



Start with one straw. Blow - how many bubbles can you see?



Now try two straws. Is it easier? Are the bubbles the same? Now try three straws. What is the difference?



What happens if you blow through lots of straws at the same time?

15 mins



If you blow through a thin tube less air gets through.



If you blow through a thicker tube more air gets through.

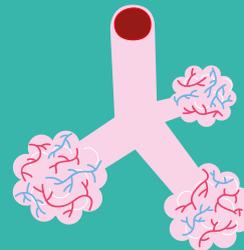


If you blow through lots of thin straws, even more air gets through, too.

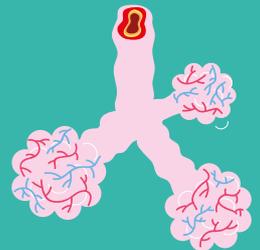


The Science

Normal airway



Asthmatic airway



Our airways are tubes that we breathe through. Healthy airways are nice and stretchy but in conditions like asthma airways become narrower, constricted and less stretchy, making it more difficult to breathe.

0

1

2

3

4

5

years

Make a Paper Whistle

Making a paper whistle to show children how sound is made through vibrations.

You will need:

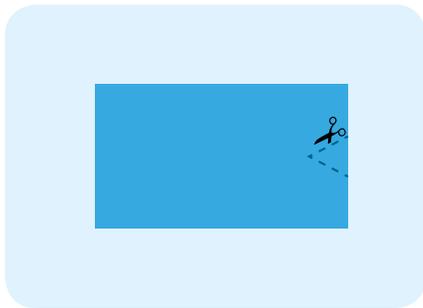
A piece of paper
20 cm long and
10cm wide



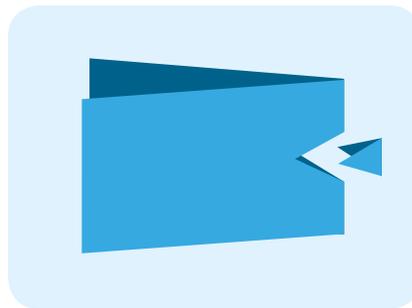
Scissors



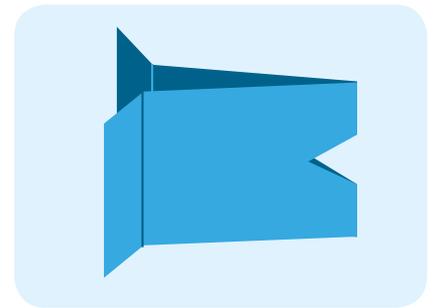
How to:



Fold the rectangle of paper in half.



Cut out a small triangle on the folded side.



Fold back the two edges and place them against your mouth. Blow!

10 mins



Blowing air through a small gap causes the piece of paper to vibrate making the sound. Try doing this outdoor with a piece of grass!



Science

Wheeze is a high-pitched whistling sound made during breathing. Respiratory infections or conditions like asthma can cause airways to become inflamed and narrow. The wheezing noise is caused by air being pushed through airways that are narrower than normal. Wheezy breathing in babies and young children is common but worth getting checked out by your doctor, especially if the child is distressed, not able to feed properly or lethargic.

You will need:Coloured
wool

Scissors

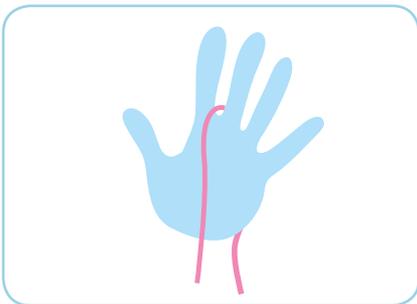
Pom Pom Pollen

Make pom poms to represent pollen grains that are blown in the breeze. Try throwing and catching games with them to see how far they travel in the air.

Top tip!

To make them more fluffy make sure you wrap it quite thick.

Make different coloured pom poms and string them up to make a mobile. You can also use them during sensory play with toddlers and babies.

How to:

First, put a piece of wool vertically through your child's finger and down past their wrist.



Now with lots more wool, start wrapping around your child's hand - not too tight! Keep wrapping until the bundle is thick.



Pull both ends of the first piece of wool up and through the fingers to meet at the top.

10 mins

Science

Pollen is a fine powdery material produced by trees, flowers, grasses and weeds to fertilise other plants of the same species. Pollen is moved from plant to plant by insects and other pollinators but also travels in the air which is when it can cause problems for us. Because pollen is so fine, we can breathe it into our nose and for some people this causes an allergic reaction called hay fever.



Now tie the first piece of wool into a half knot and ease the whole bundle up of your child's hand. Pull the knot tighter and secure



Cut the loose ends to release the pom pom strands.



Keep trimming it with scissors until it looks like a fluffy ball.

Dragon Breath

Make a fire breathing dragon and use your lungs to make the dragon roar!



You will need:



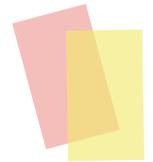
Pens



Kitchen roll



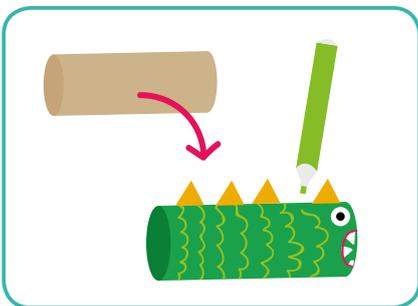
Paint



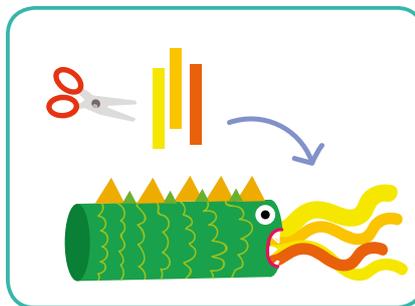
Tape

Tissue paper

How to:



Take a kitchen or tissue roll and paint or colour it green. Add some scales, ears, a spiky spine and some eyes.



Cut some strips of tissue paper and stick to the inside of the roll.



When your child blows through the roll, their breath will activate the flames to make the dragon breathe fire!

20 mins



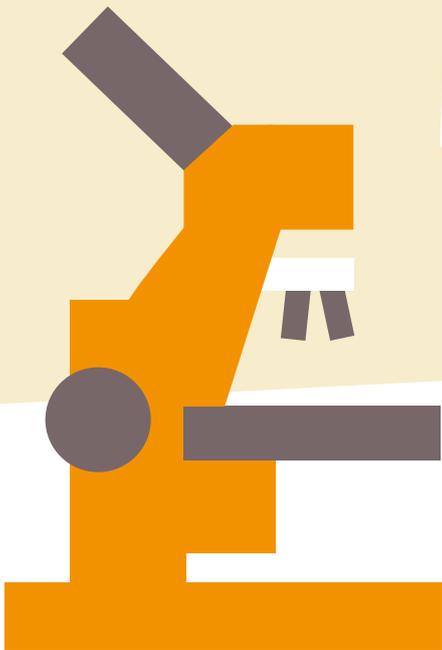
Science

If there is one good thing we can all do for our lungs, it is to avoid smoking. By not smoking we are also helping the people around us too, as passive exposure to cigarette smoke is known to harm children's lungs as they develop and slow their growth.



Helen, London

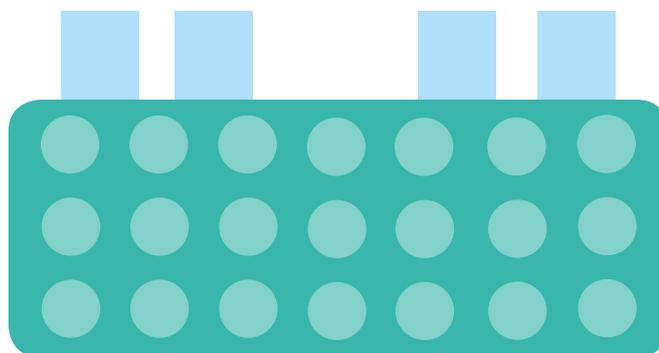
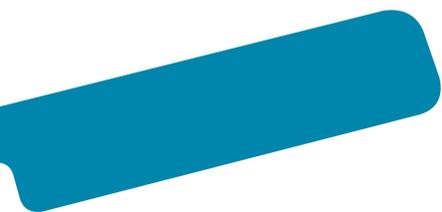
“I am a PhD student and I spend most of my time in the laboratory doing experiments on the precious samples that are collected from our wonderful participants. I love that we get to work with such rare samples collected from the babies and children on this study, which allow us to ask questions which haven’t been asked before. I love science and research, and I knew I wanted to do a PhD ever since my undergraduate. I chose this project because of how unique this study is and because I think it can potentially impact the lives of many children in the future.”



“I’m a virologist so I am interested in how viruses cause disease. The main virus I work on is RSV, which is a major cause of respiratory infections worldwide. For Breathing Together I head up one of the labs doing experiments on the cells that line the airways. We grow the cells in a very special way and then expose the top layer to the air. This top layer of cells then develop into cells with hair-like extensions called cilia that move in a beating rhythm – just like cells behave in our bodies. We use these specially grown cells to do experiments to see how they respond to viruses and allergens. Breathing Together is a fabulous opportunity to discover why some kids get more sick than others following a virus infection or exposure to allergens like dust mites. The project shows the power of working together in collaboration. Collectively we can do something really big that would never be possible as individual scientists working on our own.”



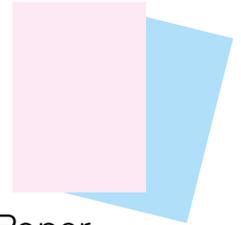
Ultan, Belfast



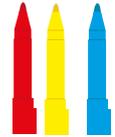
Fingerprint Dust Bunnies

Make fingerprint dust bunnies. Put some poster paints onto a plate and ask the children to put their thumbs and fingers into the colours. Then make marks on the paper using their finger prints. Next have the children turn their fingerprint marks into dust bunny characters by adding different features.

You will need:



Paper



Felt tip pens or poster paints



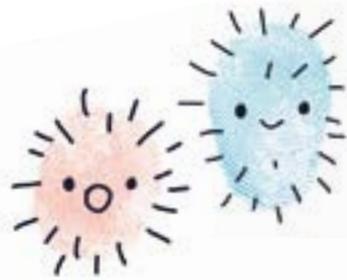
Science

Dust mites are tiny creatures that live in all of our homes and they are one of the most common causes of allergies. It is actually a substance in dust mite droppings that triggers an allergic reaction which can involve sneezing, a runny nose and breathing difficulties.

15 mins

Dust bunnies

Practice your dust bunnies here!



How to:



Start by painting the child's fingers with water based felt tip pens or dipping into splodges of poster paints.



Press the fingers onto a clean sheet of paper.



Make dust bunnies by drawing over the fingerprints. Have fun making different characters.

Make a Straw Trumpet

Help your child discover that when air is squeezed through a narrow tube it will make a sound.



Drinking straws



Scissors

Top tip!

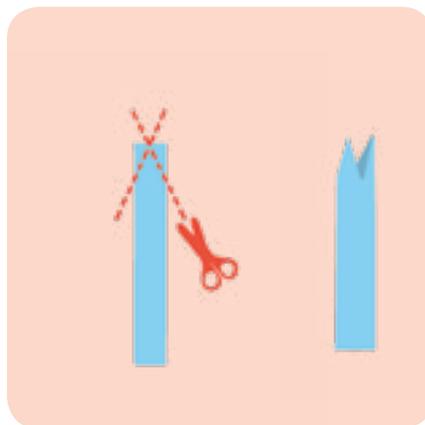
Sorry, but it's better to use plastic straws to make this trumpet.



How to:



Take a straw and cut it about here (shown on diagram).



Flatten one end and cut the tip to make a pointy end.



Put the straw in your mouth, press your lips together and blow!

15 mins

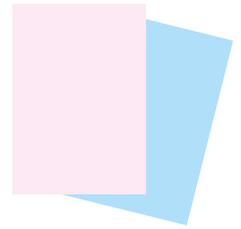
Science

Wheezing is a whistling, almost musical sound made during breathing and tends to be more noticeable on the out breath. Sometimes wheeze sounds squeaky. It is caused by the narrowing of airways and is more common in babies and young children because their airways are small, but wheeze can be a sign of breathing problems like asthma.

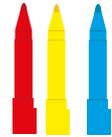


Can you get a trumpet band together? A group of children blowing their trumpets together will make quite a sound.



You will need:

Paper



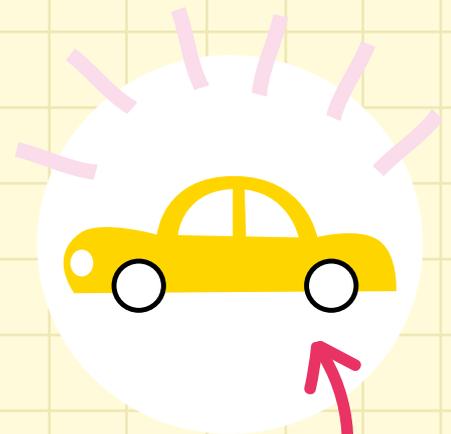
Pen or pencils

I Spy

Sit by the window or during a car journey, make a tally of the amount of vehicles, bikes and pedestrians you can see. Try to identify the different modes of transport and which ones are more polluting than others. This activity introduces basic data collection and counting.

**The Science**

Air pollution from traffic fumes, factories, smoke and dust can affect our lungs and irritate our airways. Babies (even unborn babies) and young children are more vulnerable to air pollution as their lungs are still developing so on days when pollution levels are high it's best to avoid busy roads with lots of vehicles.

**Top tip!**

Add an extra challenge such as the first person to spot a yellow car.

You can write straight onto this page!

	Tally	Total
		
		
		
		



1



2



3



4



5

Feather Racing in the Park

Feathers are very light and come in all sorts of shapes. They will move differently in the wind. This tactile activity will make your child aware of how things move in the breeze.

Keep your eyes out for different feathers you might find in the park





30 mins

What to do:

Take a trip to your local park and find some feathers. Experiment with how they move when you drop them or blow them along with your breath. Have a race to see which feather can travel the furthest in the air.

The Science

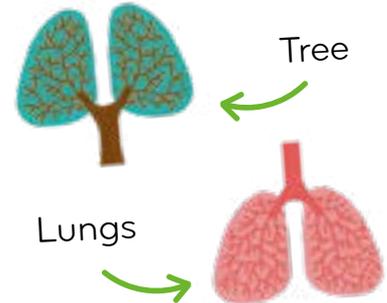
Air pollution doesn't only come from human sources such as cars and power stations, there are natural sources too. Particles that pollute our air can come from ash and soot from volcanic eruptions or forest fires, windblown dust, sea-salt spray and pollen.

Walk in the Woods

Go for a walk in the woods and do some tree bathing. It feels good to breathe deeply while you are in the middle of trees.



Trees and lungs look alike: a trunk/windpipe and lots of branches/bronchi



The Science

When we walk in the woods we breathe in the oxygen that trees release in the day time during photosynthesis. The structure of trees and lungs are similar, starting with a trunk or windpipe and then dividing into lots of branches or bronchi.

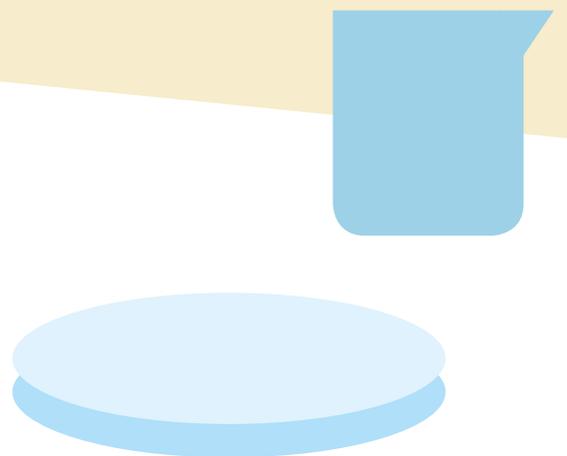
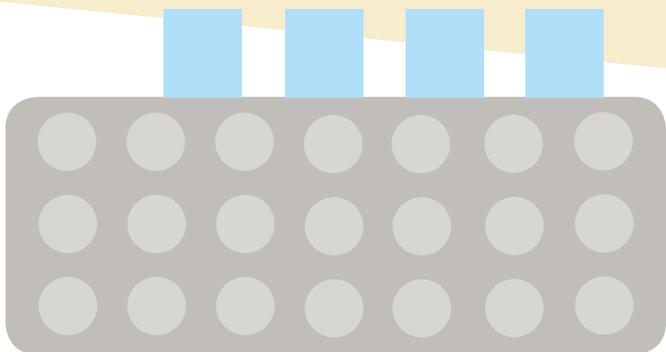
Take along a note book
and some pens so you
can draw the trees!





Maria, London

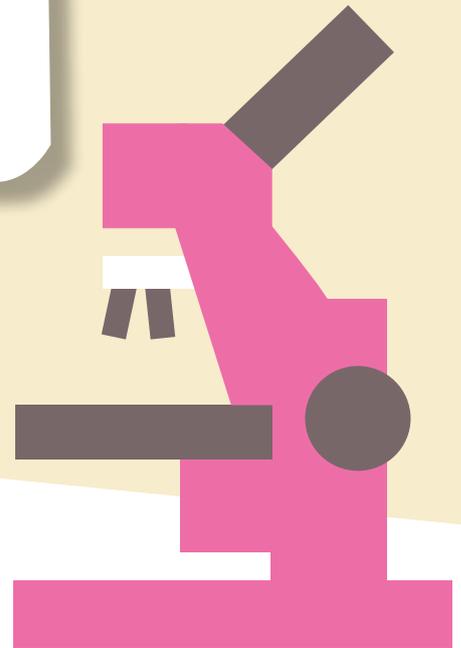
“I work with cells taken from the noses of the babies and children who are part of the Breathing Together study. I do experiments to try and understand how the cells respond to different triggers that might cause wheeze and asthma. These triggers include viruses and house dust mites, which are one of the biggest causes of allergies. To understand what is happening in the experiments I take photos of the cells through a microscope to see how well the layer of cells is connecting together. I also measure protein molecules produced by the cells as these proteins might be involved in how asthma develops.”



“I am a PhD student and I research the idea that the cells lining our lungs have the capacity to remember previous infections. On a daily basis I tend to take care of the cells in the laboratory. Sometimes I extract components from the cells, which I will then analyse. This allows me to test the questions that we ask ourselves in the Breathing Together study. I decided to work on this project because I am curious to find out whether cells lining our lungs can memorize past infections. I enjoy working with people that specialize in different aspects of the same topic; some are medical doctors, some are students in training, and some specialize in analysing huge data sets.”



Ptior, Edinburgh



Story Time

Read this story about Suki the little penguin with your baby or child.

How to:

Children can participate by speaking their 'part' and blowing at each moment they're directed to (pink text).



Suki the Little Penguin

“Hello Suki, what are you doing?”

“I’m fishing, and I’m going to catch a big fish!” says Suki.

All of a sudden she spots an enormous red fish swimming at the surface of the icy water.

“Honk-honk, it’s a balloon-fish! Let’s have a piggyback ride together over the waves!” says Suki hopping on the fish.

Can you help Suki surf the waves?

Take a deep breath...

1-2-3- Huff and puff. And huff and puff. Whoosh whoosh.

“Honk-honk! This is really good fun”, exclaims the little penguin sliding over the surface of the sea.

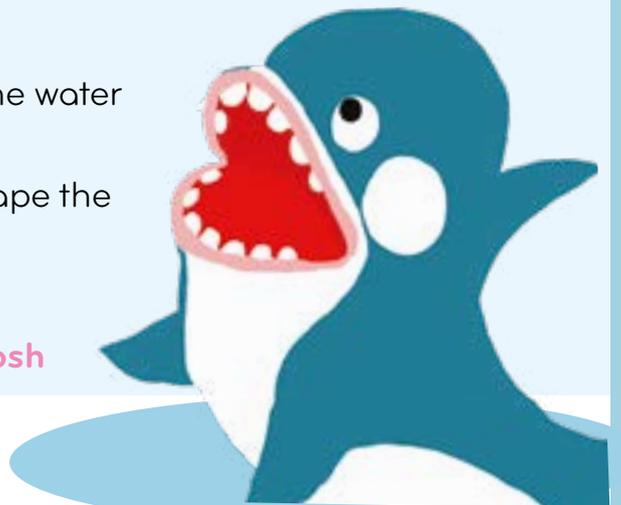
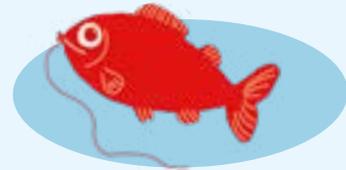
When, suddenly... watch out Suki!

A large Orca swiftly appears from underneath the water with its gigantic mouth full of teeth!

Hurry up! Take a deep breath and help Suki escape the hungry Orca.

1-2-3- Huff and puff. And huff and puff. Whoosh whoosh.

Up, up, the balloon fish goes!



“Honk-honk! I’m home!” she shouts from above.

What a surprise for her penguin friends to see Suki floating in the sky. They have never ever seen a flying penguin before.

All the colony of penguins jump up and honk with joy!

The balloon-fish floats slowly down and lands gently on the snowy ground.

After hugging everyone Suki looks at the courageous, red balloon-fish.

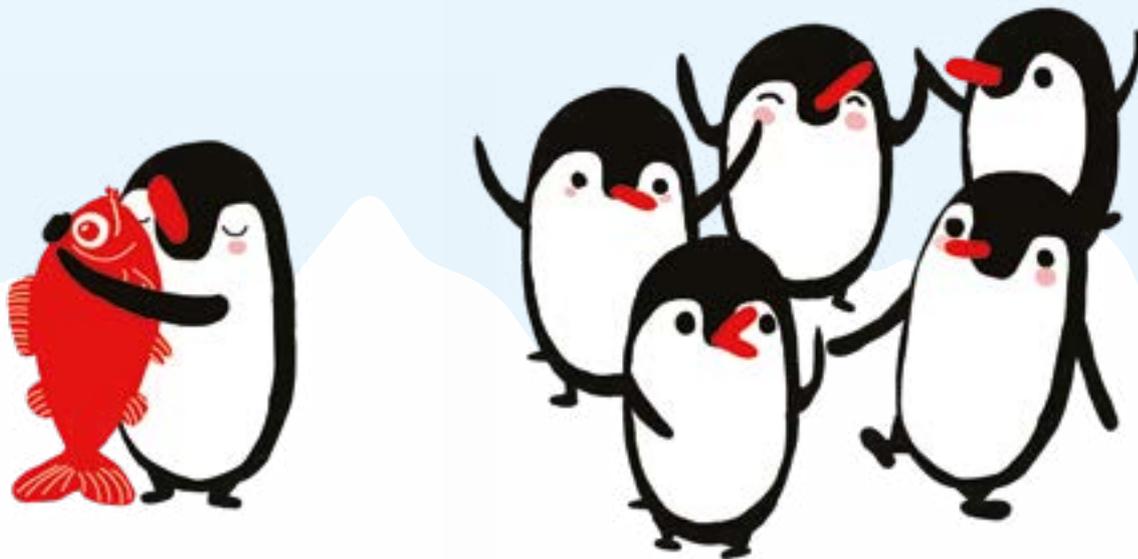
“Thank you buddy, that was a great adventure, now we are all going to help you continue your journey.”

So everybody takes a big breath.

1-2-3- Huff and puff. And huff and puff. Whoosh whoosh.

Honk honk! Goodbye balloon-fish!

And off it floats away into the sky.





Further Information

If you would like to find out more about any of the topics covered in this book, here are some useful sources of information.

AIR POLLUTION

Department for Environment Food & Rural Affairs
<https://uk-air.defra.gov.uk/air-pollution>

ALLERGIES

Allergy UK
<https://www.allergyuk.org>
NHS
<https://www.nhs.uk/conditions/allergies>

ASTHMA

Asthma UK
<https://www.asthma.org.uk>
NHS
<https://www.nhs.uk/conditions/asthma>

LUNG HEALTH

British Lung Foundation
<https://www.blf.org.uk>

SMOKING

NHS
<https://www.nhs.uk/live-well/quit-smoking/>

Action on Smoking and Health
<https://ash.org.uk/home/>

BREATHING TOGETHER

Breathing Together Research and Engagement Programme
<http://breathingtogether.co.uk>

You can download a version of this book on the breathing together website:
www.breathingtogether.co.uk/category/engagement/



or scan this code

If you would like to share your photos of these activities on social media please use the hastag
#breathingtogether



Credits

Imperial College
London



THE UNIVERSITY
of EDINBURGH

UNIVERSITY OF
Southampton





Credits

Study sites

Imperial College London
Queen Mary University London
University of Southampton
University of Aberdeen
University of Edinburgh
University of Bristol
Queen's University Belfast
Cardiff University
Monash University, Australia

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Vyan Unadkat
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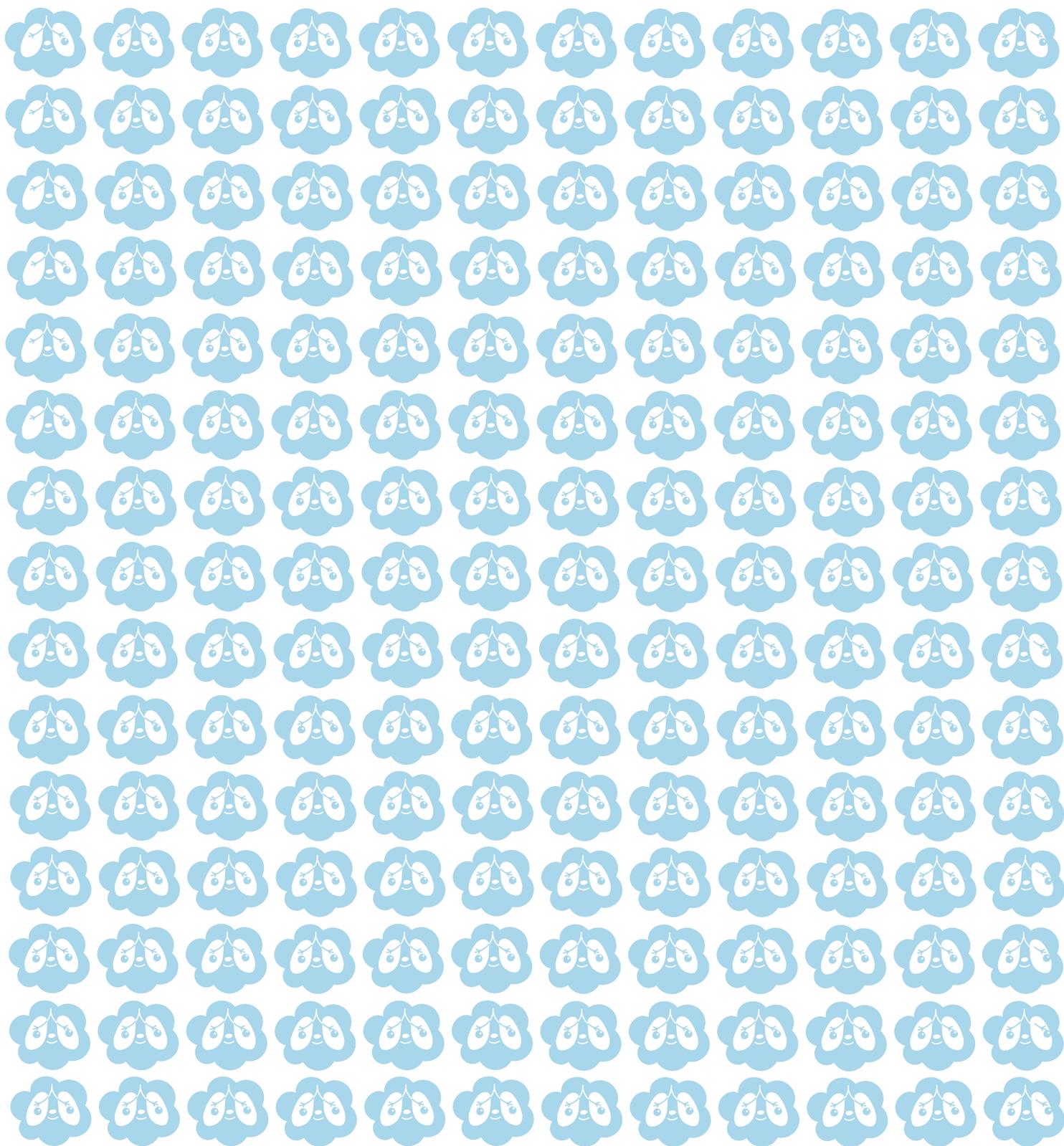
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breathing together

The Breathing Together Play and Learn Activity Guide

is full of ideas for fun and creative ways to explore breath, breathing and the lungs, together with your baby, toddler or pre-school child. Including games, stories, arts and crafts, day trips, cooking projects and experiments, the activities will create opportunities to play and learn together, discovering some of the science about how your lungs work and how to keep them healthy.

