The Air Up There:
Science for 3–5 year-olds

Big Science for Little Hands

SCIENCE WORLD BRITISH COLUMBIA

We gratefully acknowledge the financial support of the Province of British Columbia through the Ministry of Education.

CAREGIVERS, PARENTS AND PRESCHOOL EDUCATORS provide many creative opportunities for young children to explore their world. That's why we've created *Big Science for Little Hands*, an evolving suite of science resources for teachers and caregivers of 3- to 5-year-old children. Our aim is to develop activities that inspire further exploration and discovery. We hope that these resource materials complement what you are already doing and offer additional ideas to inspire further exploration.

The activities have been designed for experiential learning. The intent is for children to experience each concept, rather than simply talking about it. Each activity can serve as a starting point for further exploration.

The activities are divided into the following categories.

Introductions—These could be used to set the stage for the topic, or to find out how much the children already know. They're low-preparation, low-mess activities for a large group to do together.

Explorations—These require a bit more set-up and clean-up. They work best with small groups of children. They're intended to be open-ended, with a teacher or other adult available to pose questions and expand the activity as required.

Make This—These explorations result in a product that children can take home or display.

All Together—This big whole-group activity would make a great wrap-up to the topic.

Connections—Ideas for extending the topic in cross-curricular ways.

You know your group best! There is no perfect way to order or arrange these activities. They can be combined to spend an entire day on one theme, or used one at a time over several weeks. Please pick and choose, expand or contract as makes sense for your group of children.

Check for more resource packages coming soon:
scienceworld.ca/preschool

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Topics Now Available:

Round the Circle

Activities to explore round things and things that roll.

Wet & Dry

Activities to explore being wet and dry.

Sticky Stuff

Activities to explore stuff that sticks.

Size Matters

Activities to explore things that get bigger and things that get smaller.

Mysterious Mixtures

Activities to explore dissolving, separating, mixing and combining.

Super Sleuths

Activities to practice science process skills such as observing, comparing and contrasting and using tools like magnifiers.

Reflections and Shadows

Activities to explore light, mirrors, reflection and shadows.

Amazing Me

Discover the amazing things your body can do, both inside and out.

The Air Up There

Activities to explore wind and air.

The Air Up There

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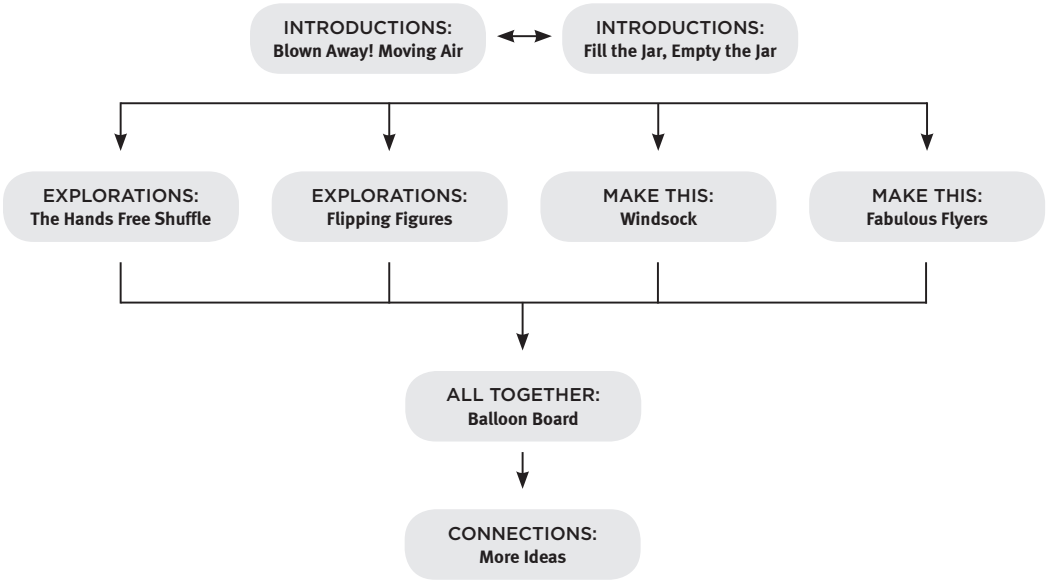
A Path Through *The Air Up There*

Here's one possible way to put the activities in this resource together.

- Do one or two *Introductions* at circle time in a large group.
- Have the children work on *Explorations* and *Make This* activities in smaller groups at stations around the room.
- Try *All Together* just before the end of the school day, or at the end of working on the topic.



Big Science for Little Hands supports the learning goals outlined in the British Columbia Early Learning Framework, particularly those in the area of Exploration and Creativity.

To promote exploration and creativity, adults provide an environment where young children can do the following:

- explore the world using their bodies and all their senses
- build, create and design using different materials and techniques
- actively explore, think and reason
- identify and try possible solutions to problems in meaningful contexts and situations
- be creative and expressive in various ways
- develop a sense of wonder for natural environments
- express a zest for living and learning
  (BC Early Learning Framework: bced.gov.bc.ca/early_learning/)

Share with us!

Please send us your feedback, suggestions and ideas.

Email bslh@scienceworld.ca or visit **scienceworld.ca/preschool** and fill in an online survey.

Thank you to the children and families around British Columbia who assisted with the testing of the activities in this package. Thank you to The Canadian Children's Book Centre for recommending many wonderful children's stories.

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Blown Away! Moving Air

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Air is made of atoms and molecules just like everything else in our environment. When we feel air on our skin, we are feeling atoms and molecules hitting us.

Wind is moving air. The faster the molecules move, the stronger the breeze we feel. You can create our own "wind" with a paper or an electric fan.

What you need

- Paper
- Paper fan (accordion folded paper)
- Electric fan
- Feathers, packing peanuts, crepe paper streamers, leaves, etc.

Hands-on

1. Wave a piece of paper to make air move.
2. Wave an accordion folded piece of paper slowly and then quickly.
3. Stand in front of the fan on low speed, and then turn up the speed of the fan. CAUTION! Always have adult supervision when using the fan. Be careful that children do not stick their fingers or other objects into the fan blade.
4. Hold a feather in front of the fan, and then let it go.
5. Repeat with the fan on different speeds and with different objects.

Questions to ask

How can we make air move?
What do you feel when you move the paper fan?
Can you make the air move faster?
Can you feel your hair moving?
When it is a windy day, what do you notice?
How else can we make air move?
What happens when we stand in front of the fan on low speed, then on high speed?
What do you see that tells you the air is moving?
What happens to your feather when you let go of it? How come?

What next?

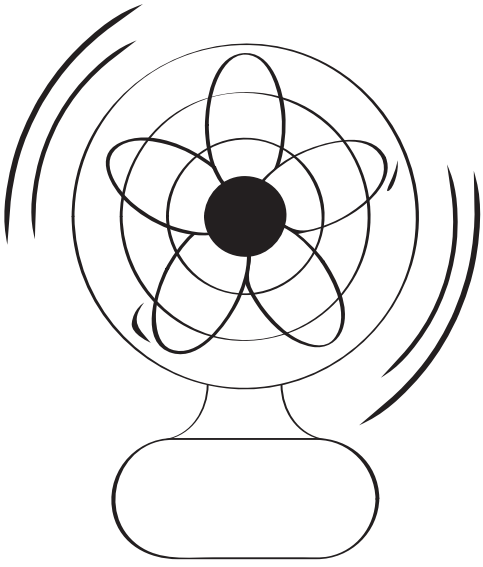
Go for a walk on a windy day. What things are being moved by the wind?

Can you hear the wind? Can you tell which direction the wind is coming from?

Make a wind chime or other item that makes sound in response to moving air.

Investigate wind dispersal of different shapes and types of seeds.

Try *Blow Painting* (see *Big Science for Little Hands* Wet & Dry).



Where to next?

Fill the Jar, Empty the Jar

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Air is made up of tiny particles called molecules. Air is made of many different kinds of gas, some of which are Nitrogen, Oxygen (which we need to breathe), Carbon Dioxide (which we breathe out), and water vapour. Even though we can't see it, air still takes up space. Because we cannot see air, water can be used to help imagine what would happen to air in the same situation. Air and water are both fluids so they behave similarly.

What you need

- 3 identical transparent containers (1L glass jars work well)
- Pan or bowl to catch spills
- Marbles, pennies, buttons (items to fill the jars)
- Sand
- Water

Hands-on

1. Fill one jar to the top with sand.
2. Try to add a handful of marbles or rocks.
3. Fill the second jar to the top with water.
4. Add a handful of marbles or rocks. Observe.
   Hint: use pan or bowl underneath to catch the displaced water.
5. Repeat with the third jar, except this time "fill" the jar with air instead of water.
6. Add the same solid objects into the jar.

Questions to ask

What is inside the jar? Is it "full"? Ask this for each jar.
Will the marbles fit in to the jar of sand? What would we have to do to get the marbles or rocks into the jar? (Take some sand out!)
What happens when you start to add the marbles, pebbles and buttons to the jar of water?
What happens to the air in the jar when you add the marbles or pebbles?

What next?

Scrunch up a big garbage bag and stuff it into your pocket — it fits easily.
Now fill the garbage bag with air and tie it closed. Now it won't fit in your pocket.
You could do the same experiment with one or many balloons to show that air takes up space.

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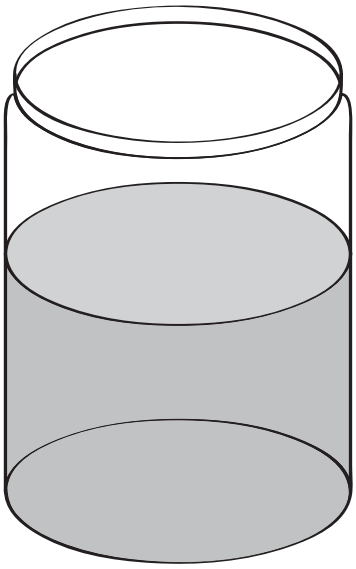

The Hands Free Shuffle

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Moving air can push on other objects, knock them over or blow them around.

What you need

- Several balls of different size and weight
- A wooden block
- A feather
- A toy car
- A rock
- Straws, paper fans, balloons

Hands-on

1. Lay the items out on a table (e.g. a tennis ball, a ping pong ball, a marble, a Duplo block, a feather, a toy car, a rock, a toy boat, etc.)
2. Try to move the items from one side of the table to the other.
3. Try moving the items again without using your hands. Try moving the items without touching them. Try moving them with air (breath).
4. Try using a paper fan, a straw or a balloon to move air to make the items move.

Questions to ask

How can we move these items?
How can we move the objects without using our hands?
How can we move them without touching them?
Can you move them using your breath?
How can you use the balloon to move the items? Or the paper fan? Or the straw?
Which items are easier to move and which are more difficult? How come?

What next?

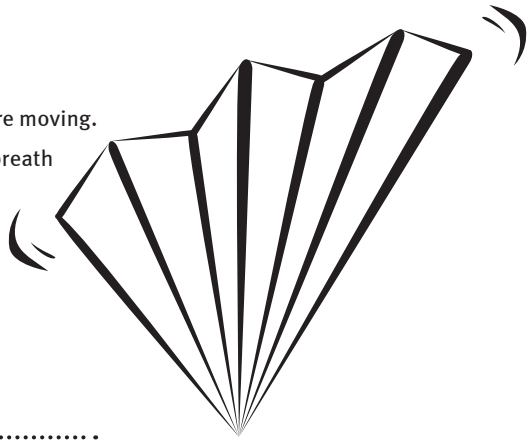
Go outside and try to find things being moved around by air. Describe how they are moving.

Have a race to see who can blow a feather across a finish line first by using their breath

Build sailboats and race them across a tub of water.

Gently blow dry sand to make “sand dunes” and other patterns.

Investigate rotating wind in tornados and hurricanes.



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Flipping Figures

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Air is all around us but usually moves so slowly that we don't notice it. To get air to move quickly we need to make it move. Using blasts of air make the paper figures fly as high as you can.

What you need

- Paper cones (paper semi circles at least 17cm in diameter, with no hole in the top, see template-flipping figures)
- Tape
- Variety of empty squeeze-able plastic bottles such as soap bottles or sports-drink bottles
- Markers, crayons and stickers for decorating (optional)

Hands-on

1. Place the cone over the top of one squeezable container and squeeze the bottle.
2. Try squeezing the bottle hard, soft or not at all.
3. Try different sizes and shapes of bottles.
4. Try taking off the tops of the bottles and placing the cones over the larger opening.

Questions to ask

How can we make the cones move?
What will happen if we put the cone on top of the bottle?
What is inside the bottle?
What happens when you squeeze the bottle? How come?
What happens when you squeeze hard or soft?
Take the lid off the bottle and squeeze it, what happens now?
Experiment with different bottles. Which one makes your figure fly highest?

What next?

Experiment with different sized cones. Which ones work best on each bottle? How come?

Try cones made of different kinds of paper and compare the results.

Try leaving a hole in the top of the cone. Does it make a difference?

Make a target. Can you get the cone to hit the target?

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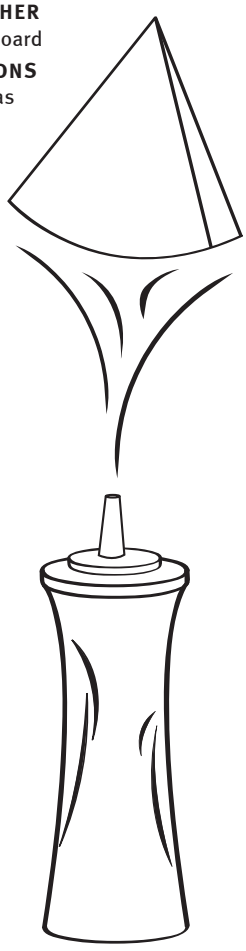

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Windsock

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The earth's surface is made of various land and water formations, and therefore absorbs the sun's radiation unevenly. Wind outdoors is produced by the uneven heating of the earth's surface by the sun, which gets the air molecules moving. Scientists use a variety of tools to measure wind, including windsocks, anemometers and weather vanes.

What you need

- Construction paper cut in half length-wise
- 15–30cm crepe paper strips
- Glue
- Tape
- String (about 30cm per child)
- Electric fan (optional)

Hands-on

1. Discuss why it is important to know about the wind and who it is important for.
2. Discuss how scientists measure the wind using different tools.
3. Attach crepe paper strips to one long edge of the construction paper with either tape or glue.
4. Roll the construction paper in to a cylinder so the crepe paper dangles out one end. Tape in place.
5. Tape the two ends of the string inside the cylinder at the opposite end from the streamers (to make a handle).
6. Try out the windsock outdoors or in front of a fan.

Questions to ask

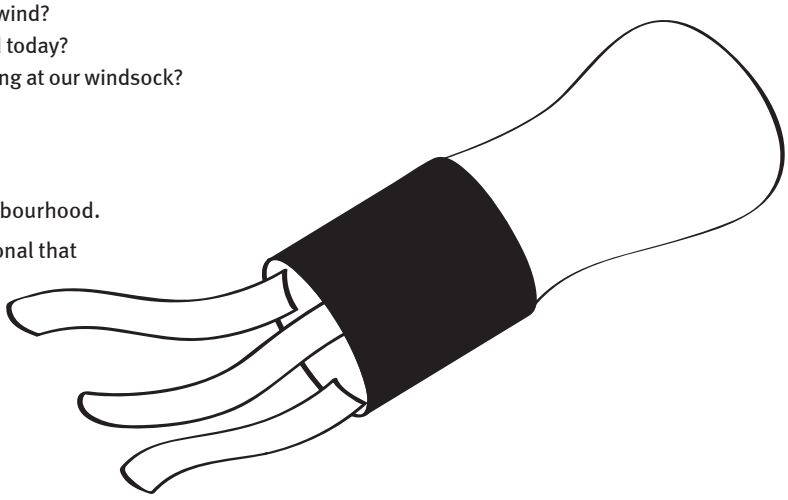
Who needs to know about the wind? Why might it be important for a pilot to know how windy it is outside?
What kind of information could we find out about the wind?
How will our windsock help us find out about the wind today?
How can we tell if the wind is gentle or strong by looking at our windsock?
Hint: a fan would help with exploring this.

What next?

Look for windsocks, turbines, and fans in your neighbourhood.

Invite a meteorologist, pilot, sailor or other professional that needs to know about the wind in to your classroom.

Keep track of the wind everyday for a week or two, including direction and relative speed.



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Fabulous Flyers

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Various shapes of paper will be affected by air resistance in differently, which causes them to move in different ways. All paper will fall due to gravity, but how each paper shape is affected but air pushing back against it varies. The flat parts of the paper as it falls are pushed by air and may cause it float, spin or twirl.

What you need

- A piece of paper, flat
- A piece of paper, crumpled
- A paper airplane
- A paper helicopter (see template-spinning 'copter)
- A paper 'fish' (see template-spinning blimp)

Hands on

1. Drop the flat piece of paper from a height. Observe how it falls.
2. Drop the crumpled piece of paper from a height. Observe how it falls.
3. Drop the paper airplane.
4. Drop the paper helicopter.
5. Drop the paper fish.

Questions to ask

What do you think will happen when the flat piece of paper is dropped from a height?
Observe each paper shape closely as it is falling, what can you see happening?
Which one falls the fastest and which is the slowest? How are they moving?
Why do some spin?
How come they move differently?

What next?

Try flying a kite outside on a windy day.

Experiment with small parachutes. Which material makes the best chute (i.e. falls the slowest)?

Find instructions for kites, paper airplanes and parachutes here:
scienceworld.ca/preschool

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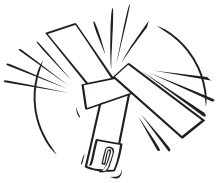

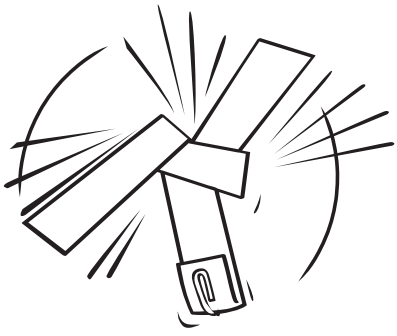

Balloon Board

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Balloons are fragile if there is only one, but if you group many together they can be quite strong. If you can distribute a weight out over many balloons, they are capable of handling a larger weight because of their stretchiness.

What you need

- 12–20 good quality balloons
- A lightweight table or board, about 150cm long and 60cm wide
- A rug or towel

Hands-on

1. Blow up the balloons almost all the way — they should still be squishy rather than taut.
2. Arrange the balloons on a rug or towel.
3. Carefully place the board or the upside down table on top of the balloons. Have two adults hold the board steady.
   Have an adult help the children stand on top of the board one at a time, as many as you can fit on the board. CAUTION! Popping balloons can be frightening, and small pieces of balloon are a potential choking hazard. You could put the balloons into large clear garbage bags or mesh ball bags to contain the pieces.

Questions to ask

What is happening to the balloons? Why aren't the balloons popping?
What is holding up the children?
How many children can we get on the board?
What would happen if one child stands on one balloon?

What next?

Make Balloon Racers:
http://scienceforpreschoolers.com/archives/7

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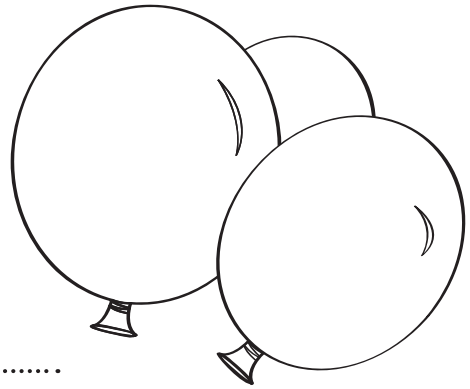

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More Ideas

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Air and Wind Songs

- *The Colours of the Wind* from Disney's *Pocahontas*
- *If I Could Have a Windmill*
- *I'm a Little Teapot* by Jane Cobb has a few songs about Autumn and Wind
- Songs about wind found here:
  www.preschoolexpress.com/music_station02/music_station_mar02.shtml

Airy Snacks

- Rice cakes, popcorn or cheezies
- Pavlova or other meringue desserts
- Bread

Children's Books about Air and Wind

- *The Three Little Pigs*
- *I Face the Wind* by Vicky Cobb
- *Air. Outside, Inside and All Around* by Darlene Stille
- *Let's Try It Out in the Air* by Seymour Simon and Nicole Fauteux
- *Air* by David Bennett
- *Air* by Dana Meachen Ray
- *Millicent and the Wind* by Robert Munsch
- *The Wind Blew* by Pat Hutchins
- *Feel the Wind* by Arther Dorros
- *Gilberto and the Wind* by Marie Ets
- *Mirandy and Brother Wind* by Patricia Mckissack
- *The Emperor and the Kite* by Jane Yolen

Resources for teachers

- *Science Play* by Jill Frankel Hauser (ISBN 1-885593-20-1)
- www.parentingscience.com/preschool-science-activities.html
- *A Head Start on Science* by William C. Ritz (ISBN 978-1-933531-02-1)
- *The Preschool Scientist* by Robert A Williams, Elizabeth A Sherwood, Robert E. Rockwell and David A Winnett (ISBN 978-0-87659-130-7)

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Try This at Home:
Flipping Figures

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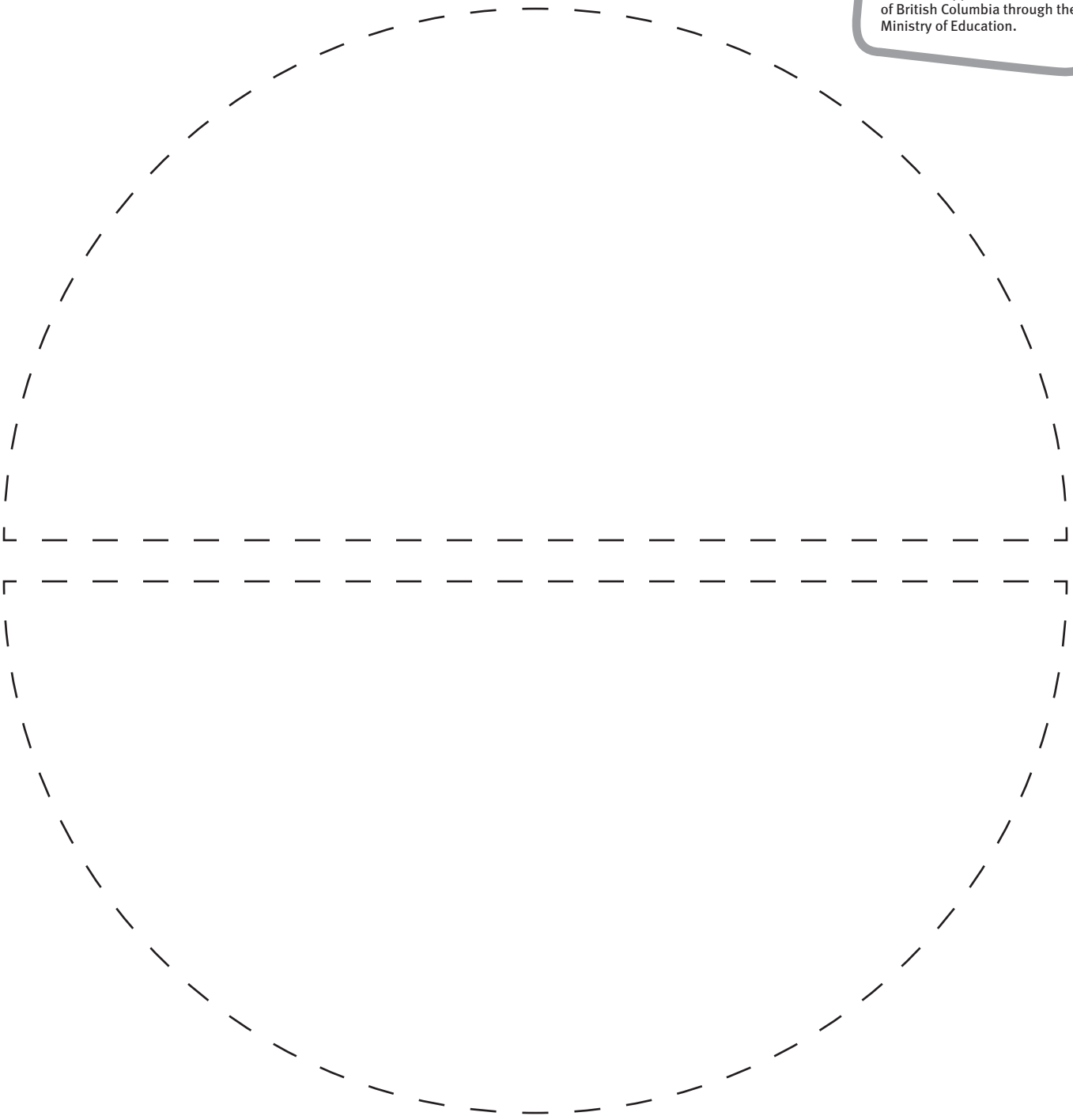

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Try This at Home:
Spinning 'Copter

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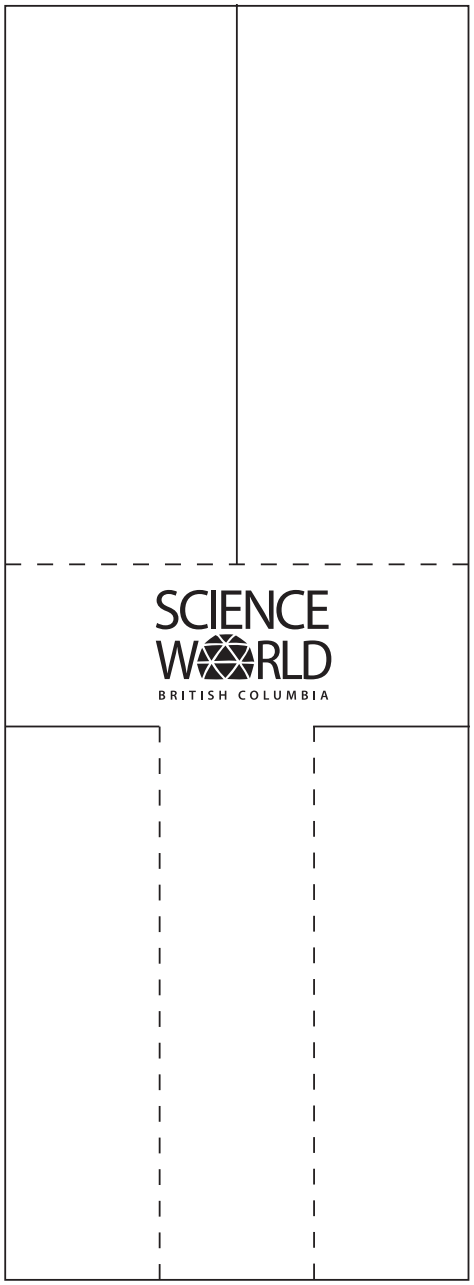
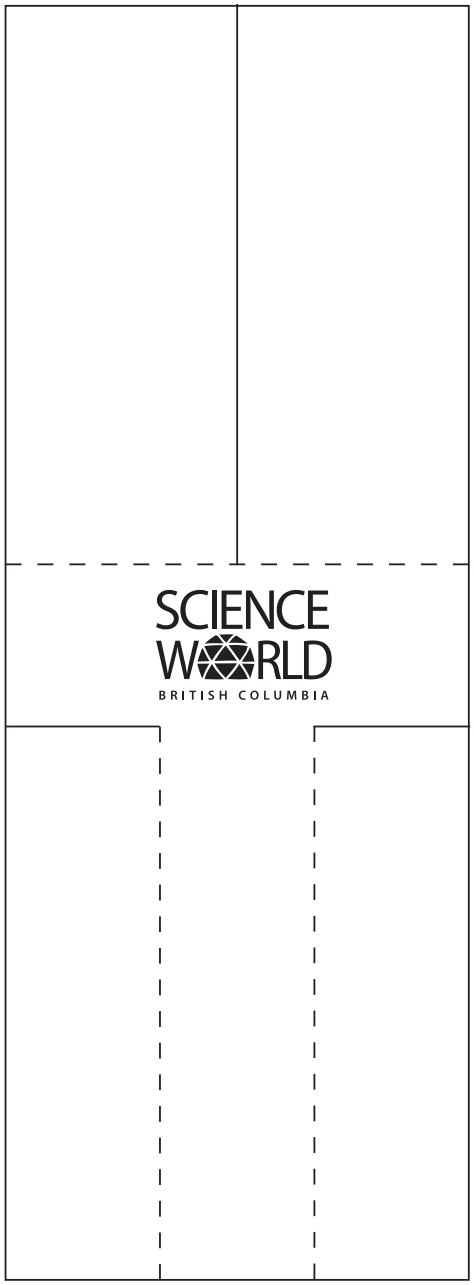
Cut
Fold





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Try This at Home:
Spinning Blimp

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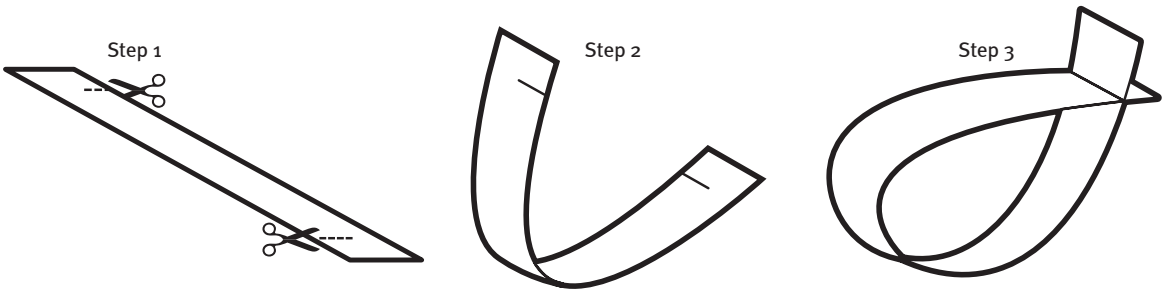

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