

The cover features a light blue background with diagonal rays and small white stars. Several hexagonal frames are arranged in a cluster, each containing a different scientific or natural image: a laboratory with glassware, a landscape with a waterfall, fresh vegetables, a view of Earth from space, a forest stream, a coral reef, a field of wheat, a starfish, and green leaves. The title is centered in a large, white, rounded font with a blue shadow.

Science.gc.ca Activity Book 5

Welcome to the FIFTH edition of the Science.gc.ca Activity Book!

Science is all around us and can be discovered, explored and used in so many ways!

This new Activity Book showcases the diversity of the world of science through activities in health, biology, environment, agriculture, meteorology, astronomy, engineering, the living world and much more!

Science.gc.ca is the official Government of Canada website for Science and Technology (S&T) information and resources. We have put together this Activity Book to stir your inner scientist. Whether you are in elementary, intermediate or secondary school there are activities for all ages and skill levels. These activities can be done individually or with friends in class, at camp, at home or with your Girl Guides of Canada or Scout Canada clubs.

If you would like to learn how to *make invisible ink*, *build a mechanically powered launcher* or even find out our *mystery phrase*, you'll find it all inside this Activity Book! For more activities, you can visit Science.gc.ca and download our previous Activity Books. While you are there, don't forget to check out [Videos](#), [Games](#) and [Educational Resources](#) for more science and technology experiments, activities and facts. You can even submit a question to "[Ask a Scientist](#)".

Science.gc.ca challenges you to go out, explore and look for science everywhere you go.

We would like to thank our funding partners for their ongoing participation and support:

- Aboriginal Affairs and Northern Development Canada
- Agriculture and Agri-Food Canada
- Canadian Food Inspection Agency
- Canadian Space Agency
- Defence Research and Development Canada
- Environment Canada
- Fisheries and Oceans Canada
- Foreign Affairs and International Trade
- Health Canada
- National Research Council
- Natural Resources Canada
- Natural Sciences and Engineering Research Council
- Public Health Agency

Go ahead, get started; discover and explore the fascinating world of science!

Sincerely,
The Science.gc.ca Team

Elementary Level Activities

Best suited for ages 5 to 10





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1

Find the hazards

Circle **10** safety hazards and write them down



1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

2 Build a windmill

A fan uses electricity to produce wind, but a wind turbine uses the wind to produce electricity. As long as the wind continues to blow, wind energy can be produced.

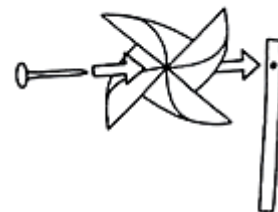
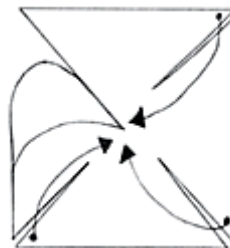
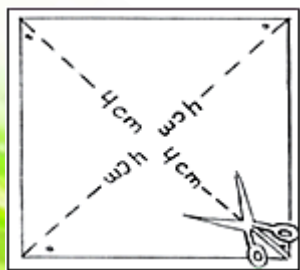
Materials

- 20-centimetre square of paper
- Plasticine
- sharp pencils, rulers and scissors
- paper fasteners
- beads (with centre holes wide enough to slide onto the paper fastener)
- drinking straws

Generate your own wind power!

It's easy. Just follow these steps:

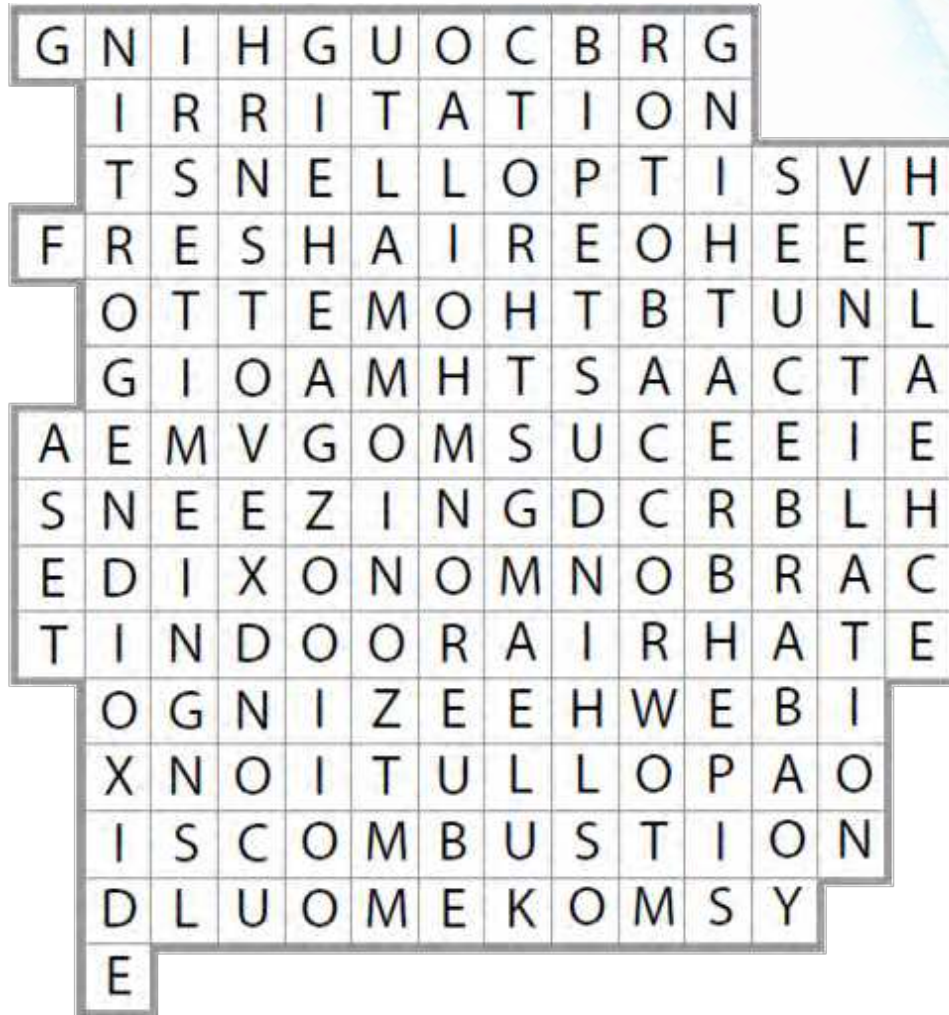
1. Fold your paper in half diagonally. Press along the crease. Unfold it. Fold it across the other diagonal and press along the crease. Flatten it out again.
2. From the centre where the creases meet, measure 4 centimetres (cm) along each crease line and make a dot with your pencil. Cut from the outside corner along the crease to the dot. Don't cut all the way to the middle.
3. Roll some plasticine into a ball. Place it under the centre spot of your paper. Use a sharp pencil to make a small hole in the centre of your paper. Using the plasticine again, make a hole on the left side of each corner so you have five small holes.
4. Fold each corner toward the centre so the holes line up with the hole in the middle. Push a paper fastener through all five holes.
5. Thread a bead onto the back of the paper fastener. This will make it spin better.
6. Measure down 2 cm from the top of your straw. Make a small hole through both sides of the straw with a sharp pencil.
7. Push the paper fastener through the holes and fold the ends back to hold your windmill together.



3

Word Search

Find these **hidden words** related to indoor air pollutants! The words could be up, down, left or right so look carefully! Then use the leftover words to spell out the secret.



Secret: _____

ASTHMA
BARBECUES
BREATHING
CARBON MONOXIDE
COMBUSTION
COUGHING

DUST
FRESH AIR
HEALTH
HOME
INDOOR AIR
IRRITATION

MITES
MOULD
NITROGEN DIOXIDE
POLLEN
POLLUTION
SMOG

SMOKE
SNEEZING
STOVE
TOBACCO
VENTILATION
WHEEZING

4 Mystery Phrase

Everywhere the sun shines, there is solar energy. We take advantage of this energy in simple ways – by opening the curtains in winter to help heat the air or by filling our pool before we want to swim so the water has a chance to warm up.

Scientists rely on all their creative powers to come up with ways to capture and use the sun's power.

Now it's your turn to solve a mystery! Use the following table – each symbol represents two letters. Use the following codes to find the mystery phrase.

^ @ : ! % % ! % % & : ? ^ ^ % % %
 # : % ! ! ! ! \$ % % ! % < ! @ : %

Legend

!	A	N
@	B	O
#	C	P
\$	D	Q
%	E	R
^	F	S
&	G	T
0	H	U
?	I	V
<	J	W
>	K	X
:	L	Y
[M	Z



5

A Certain Something in the Air

The atmosphere plays an important role in how our planet functions. It protects us from the sun's rays and regulates our climate, making our survival possible.

Go for a walk outside.

Describe the odours you can smell in the air:

■ Fruity? ■ Floral? ■ Diesel? ■ Other: _____

What direction is the wind blowing from? _____

What did you do to find out?

See any clouds in the sky? How are they shaped and what does their shape tell you?



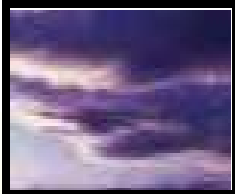
Cirrus

Located high in the sky, cirrus clouds sometimes indicate that rain is coming.



Cumulus

Located low in the sky, these clouds often appear in good weather. In the hot, humid days of summer, they can transform into cumulonimbus clouds.



Stratus

Usually sitting fairly low in the sky, stratus clouds often cause "grey" days and can herald storms or drizzle.



Cumulonimbus

These are large grey clouds, taller than they are wide; in summer, they are a sign of stormy weather.



6

Make invisible ink

Invisible ink is used to write messages that are **undetectable** to the naked eye. Discover your inner “secret agent” by creating and revealing your own hidden messages in this fun and simple chemistry experiment.

Materials

- Baking soda
- Water
- Bowl
- Spoon
- Toothpick, cotton swab, paintbrush or other tool for writing
- White paper
- Purple grape juice

Instructions

1. Add equal parts baking soda and water to bowl; stir with spoon. Make sure the baking soda dissolves well so as not to be too powdery.
2. Dip toothpick, cotton swab or other writing tool into the “ink”; write a message on the paper.
3. Allow the ink to dry completely until it is invisible.
4. Paint over the paper with purple grape juice to reveal your message.

What just happened?

This is a classic example of an acid-base chemical reaction. The acid in the grape juice is neutralized by the baking soda (the base), producing a colour change on the paper to reveal your message.



7

Growing sugar crystals

Crystals form in different manners. Snow crystals grow directly from moist air — i.e. from water vapour. Growing other crystals from liquid solutions is easy to do with your children or students.

Materials

- 250 ml Distilled water (with no impurities)
- 375 – 500 ml White, granulated sugar
- 1 Paper clip
- 1 Popsicle stick
- String
- 1 Tall, thin glass jar
- Small saucepan
- Food colouring (optional)



Instructions

1. Pour the water into a saucepan and carefully bring to a boil. Remove it from the stove.
2. Gradually stir the sugar into the hot water, a spoonful at a time, stirring after each spoonful to dissolve. Keep adding sugar to hot water until no more will dissolve (you have made a “supersaturated” solution).
3. Pour your solution into the tall, thin jar.
4. Cut a piece of string that is about two mm shorter than the height of the jar. Tie one end to the centre of the Popsicle stick and attach a paper clip to the other end.
5. Rub a few grains of sugar along the string.
6. Slowly lower the string into the solution, making sure that the paper clip does not touch the bottom of the jar. Rest the popsicle stick across the rim of the jar.
7. Let the solution cool and allow it to rest for about five days.

What happens?

Sugar crystals should start to grow along the string after several days. The grains of sugar on the string act as the seeds on which crystals dissolved in the water are deposited. The longer the solution remains undisturbed, the larger the crystals grow. If you add food colouring when you prepare the solution, then the sugar crystals will be lightly coloured.

8

Wash your hands

Always wash your hands before eating, before helping to prepare food, or setting the table. Washing your hands gets rid of bacteria that could make you sick. Wash your hands with soap and warm water for 20 seconds (sing the Happy Birthday song twice).

“Recipe” for washing hands. Put these steps in the correct order.



1 _____



2 _____



3 _____



4 _____

5 _____

6 _____

7 _____



9

Environmental Review

The environment is how plants, animals and humans interact with the land, air, and water around us. How we act and what we do can affect the environment. Everything works together. The Mining Company is looking at opening a mine near Grandfather's summer camp. Join Johnny and Lisa as they follow Grandfather through the environmental review process.

Grandfather, we hear there may be a mine opening near our summer camp! Do you know anything about this?



Yes! In fact last summer, The Mining Company flew me to where they want to build the mine. They asked me questions about the area and how we traditionally use the land.



Look! This poster says that The Mining Company is going to have a presentation to review their plans and what it could mean for the land.



Let's look at the information that The Mining Company gave me about the new site. The company has to tell us how the new mine will impact hunting, camping, water and the animals.



This is a chance for us to get involved in the process. We can make sure that things are done to the land in a responsible and respectful way.



Grandfather, who are all those people?

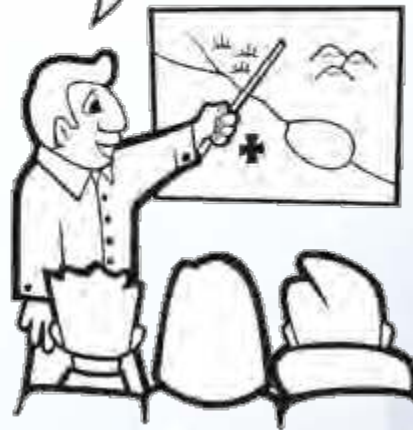
Nunavummiut sit on an advisory board. It is their job to make sure that all our concerns are heard and that the land and people are respected.



The proposed site for the mine is near where we fish for char. How can we control the mine's impact on fish?



As you can see on the map, we're taking all precautions to ensure that the mine won't affect the water.

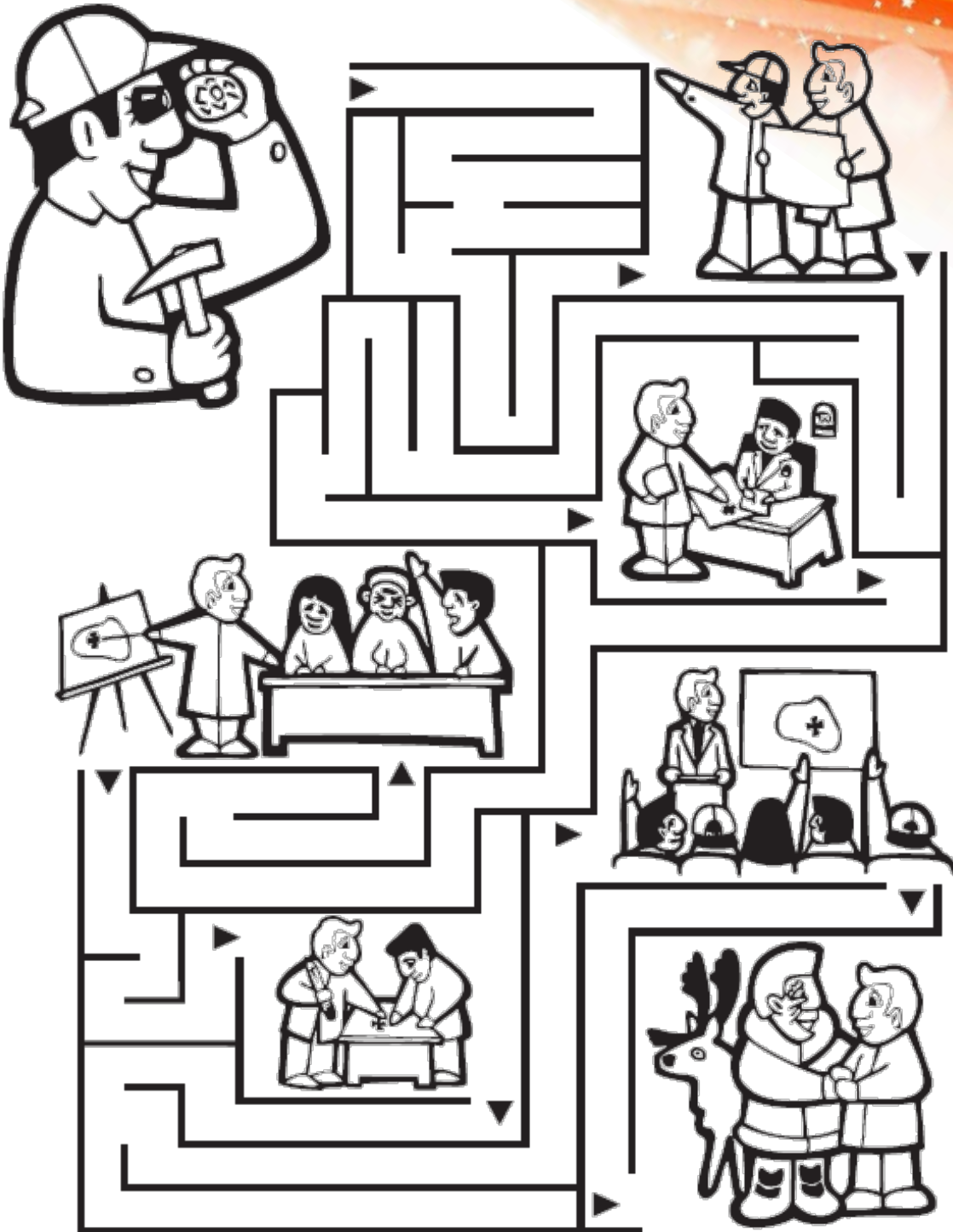


Now that the meeting is over, what happens next?

The board and The Mining Company will review all the concerns brought forward and send them to the Minister of Aboriginal Affairs and Northern Development. If all goes well, a mine could be opened in a few years.



Solve the maze.



Nunavut is a special place.

The environment here is what makes us who we are.

We must remember to treat the land with respect.

The land is ours to use wisely.

First Nations people were acutely aware that nature's life cycles must adjust to many variables. In this activity, students will have an opportunity to observe changes in nature by examining a portion of their playground. It will allow students to draw conclusions about the seasonal change in a habitat over a period of time.

The following **materials** will be needed:

- camera
- fencing/rope
- waterproof sign (laminated cardboard or wood and paint)
- rain gauge

Preparation:

Get permission from the school to fence off a small grassy or wooded area in the playground (approximately 10 square metres) for an entire school year. This may be done by the students. Assist the children in preparing a sign that says "PLEASE DO NOT DISTURB. SCIENTIFIC EXPERIMENT IN PROGRESS. DO NOT WATER, MOW OR FERTILIZE THIS AREA."

Method:

Designate a day and time each week to collect data. Depending on how sophisticated you wish to make the activity, students may record the following:

- a photograph of the plot, taken from the same place. Date each picture, so that changes can be seen over time.
- temperature and other weather conditions
- amount of water in the rain gauge. This may be done after every rain or snow instead of once a week
- number and kinds of plants and insects in the plot

You might also have the children draw a weekly journal entry. Each drawing should include observations on plant growth, colour changes, and insect and animal activity. At the end of the year, the children can make a display of their charts and photographs to share with other people.



11

Natural dyes

Colours are significant to many First Nations. For example, red, black, yellow and white are the colours of the Medicine Wheel, a vital teaching tool among many First Nations. Many First Nations decorate their clothing, hunting implements and other objects with natural colours through embroidery using dyed moose or caribou hair, beads made from coloured shells or dyed porcupine quills.

Purpose:

This activity will help students understand how some colours are extracted from nature to be used as dyes.

With the following materials, students can create natural dyes in the classroom:

- Spinach or moss – green
- Sunflowers or onion skins – yellow
- Beets and wild berries* – red, purple, blue

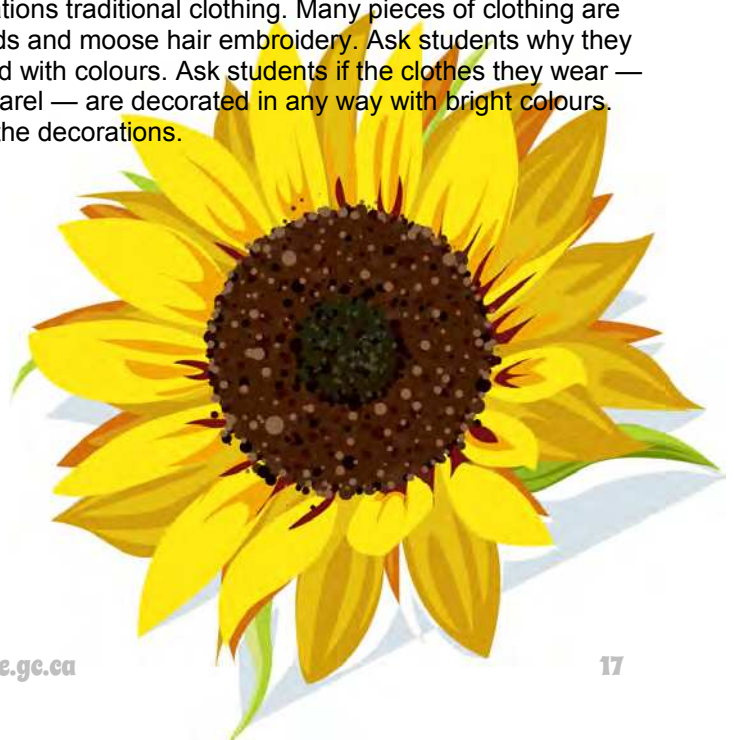
*Wild berries are a good source of colour. Ask the students to bring in a variety of berries such as strawberries, blueberries, cranberries, salmonberries, raspberries, gooseberries, blackberries, thimbleberries, huckleberries, and red and black currants. After pressing the berries, have the students compare the different reds, purples and blues extracted from the various berries.

Method:

Ask students to bring these items to class. Have them soak the items in water and then press them to produce coloured dyes to use in their artwork. Use the resulting dyes to paint on rocks or paper.

Extension:

Show students pictures or illustrations of First Nations traditional clothing. Many pieces of clothing are decorated extensively with brightly coloured beads and moose hair embroidery. Ask students why they think traditional First Nations clothing is decorated with colours. Ask students if the clothes they wear — running shoes, caps, sport jackets and other apparel — are decorated in any way with bright colours. Ask students the importance of these colours to the decorations.



12

Germs Away

Infectious diseases account for millions of lost school days each year. It's not surprising when you think about it because school is all about sharing: desks, books, pens, bathrooms, doorknobs, water fountains, computers and...germs. From colds...to the flu...to skin infections. Students share close contact with other students and teachers all day, every day. Students and staff can bring illnesses home with them and can unknowingly infect family members. **Clean hands are critical.** One of the most common ways people catch colds is by rubbing their nose or eyes after touching someone or something that is contaminated with the cold or rhinovirus virus.

Here are some great tips to keep the germs away!



Cover your mouth and nose with a tissue when you cough or sneeze.



Cough or sneeze into your upper sleeve, not your hands.



Put your used tissue into the wastebasket.

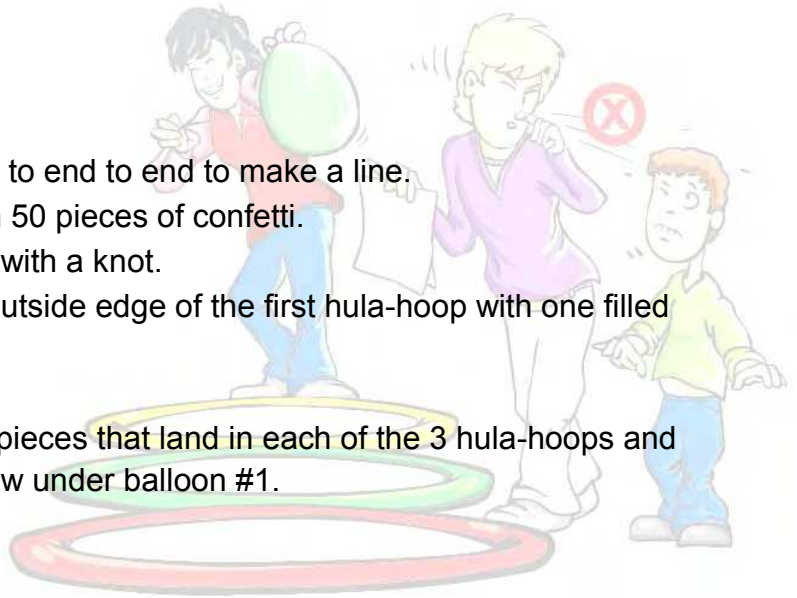
We've shown you **HOW** to cover a cough or sneeze. But should you cover your cough? Let's do an experiment to find out **WHY!**

What you will need:

- Three hula-hoops
- Two round balloons
- 100 pieces of confetti split into two piles of 50 pieces (idea: use a hole puncher)
- One tack
- One piece of 8" X 11" paper
- One broom and dustpan

What to do:

1. Lay the three hula-hoops end to end to end to make a line.
2. Fill each deflated balloon with 50 pieces of confetti.
3. Blow up each balloon and tie with a knot.
4. Have someone stand at the outside edge of the first hula-hoop with one filled balloon in hand.
5. Pop the balloon with the tack.
6. Count the number of confetti pieces that land in each of the 3 hula-hoops and record them on the chart below under balloon #1.
7. Sweep up the confetti.
8. Repeat numbers 1 through 4.
9. Have someone hold the piece of paper in front of the second filled balloon so the paper is between the balloon and the hula hoops
10. Pop the balloon with the tack.
11. Count the number of confetti pieces that land in each of the 3 hula-hoops and mark it down in the chart below under balloon #2.
12. Sweep up the confetti.



	Number of confetti pieces in hula-hoop #1	Number of confetti pieces in hula-hoop #2	Number of confetti pieces in hula-hoop #3
Balloon #1 No paper used			
Balloon #2 Paper used			

What does it mean?

Imagine each piece of confetti is a germ. See how easily it spreads? Imagine the piece of paper is a tissue, or your sleeve. How did the “germs” spread differently?

What other ways can you reduce the spread of...**GERMS?**