

# Air and Water



Teacher's Notes

Ontario Science and Technology Curriculum 1999  
 Strand: Earth and Space Systems  
 Topic: Air and Water in the Environment  
 Grade 2

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Developed by T. Tasker

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Overall Expectations

- demonstrate an awareness of the forms in which water and air are present in the environment, and describe ways in which living things are affected by water and air
- investigate the visible effects of air and water in the environment
- describe ways in which clean air and water are vital for meeting the needs of humans and other living things

Specific Expectations

\* All specific expectations are covered by this unit and are mentioned at the end of each activity. The following are specific expectations that are met throughout the unit but are not specifically mentioned: ES10: plan investigations to answer some of these questions or solve some of these problems, and describe the steps involved.

Materials Box	Needed day of . . .
dish towels            plastic wrap rolling pin            elastic bands deep cake pans        clear cups salt                    round ziploc containers spoon                  cooking oil cotton swabs           sugar petroleum jelly       2L pop bottle cut in half jars                    filter paper paper plates           cotton balls water                  sand fan                     pebbles lamp                    soil bowl                    straws string                  balloons a piece of wool        construction paper paper towel            kettle seeds                  clothes pins measuring cups       piece of cotton	ice cubes
<u>Magic School Bus at the Water Works</u> by Joanna Cole and Bruce Degen <u>Magic School Bus Wet All Over: A book about the Water Cycle</u> by Joanna Cole and Bruce Degen	



Dear Parent or Guardian,

We are beginning our next Science and Technology Unit, Earth and Space Systems, Air and Water in the Environment. By the end of this unit, your child will:

- demonstrate an awareness of the forms in which water and air are present in the environment, and describe ways in which living things are affected by water and air
- investigate the visible effects of air and water in the environment
- describe ways in which clean air and water are vital for meeting the needs of humans and other living things

As outlined in the Science and Technology Curriculum, Ministry of Education , 1999.

Home Links:

To help your child further their understanding of this science unit, here are some fun activities for you and your family:

- visit a water filtration plant.
- catch snowflakes on a black piece of construction paper.
- Watch how the streets dry up after a rain storm.



Happy Adventures,

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# Air and Water in the Environment

## Let's be Meteorologists!



Let's record our weather

Monday	Tuesday	Wednesday	Thursday	Friday
<b>**Have students draw the weather for that day.**</b>	<b>**This activity should be done at the beginning of each science period.**</b>			

Let's graph our weather! **\*\*Create a bar graph below.\*\***

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Sunny ' ☀															
Cloudy ☁															
Rainy ☔															
Sun and Cloud ☀☁															
Snowy † ❄															
Windy 🌪															

Grade 2 ESactivity001 covers:

ES12:record relevant observations, findings, and measurements, using written language, drawings, concrete materials, and charts (eg. record and graph weather data gathered over a period of a few weeks)

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# Air and Water in the Environment

## Looking at the Four Seasons



1) Draw yourself and what you would wear in each season.

Winter	Spring	Summer	Fall

What two seasons do you dress the same? *Fall and spring*

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What do birds do when it gets . . .

COLD: <i>migrate</i>	WARM: <i>migrate</i>
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Birds *migrate* when the temperature changes.

What do bears do when it gets . . .

COLD: <i>hibernate</i>	WARM: <i>wake up</i>
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Bears *hibernate* when the temperature gets colder.

What do plants do when it gets . . .

COLD: <i>become dormant</i>	WARM: <i>grow</i>
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Plants are *dormant* during the winter.

Grade 2 ESactivity002 covers:

ES4: identify ways in which changes in temperature affect living things, including themselves (eg. decisions concerning activities or transportation, hibernation, dormancy, migration)

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## Air and Water in the Environment How Weather Affects Us

People tune in to the weather forecast to help them prepare for their day. Draw what you would wear for each kind of weather.

Rainy	Hot and Sunny	Snowy

Describe using pictures and words what wind does to the leaves on trees in the autumn.

With words	With pictures
<p><i>The wind blows the leaves off the trees.</i></p> <hr/> <hr/> <hr/>	



Describe using pictures and words how well our cars travel after a great big snow storm.

<p>With words</p> <p><i>Cars find it hard to drive because the roads are slippery with snow.</i></p> <hr/> <hr/> <hr/>	<p>With pictures</p> <p><b>** You could relate this to the student's world with tobogganing.**</b></p>
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Grade 2 ESactivity003 covers:

ES14:predict and describe how local weather conditions affect living things, including themselves (eg. effect of wind on trees in autumn, effect of snowfall on humans' ability to travel)

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## Air and Water in the Environment Looking In and Out

Let's compare what it is like indoors to outdoors using our descriptive words.

Indoors	Outdoors
<p><b>** Encourage words such as warm, comfortable, thermostat etc. **</b></p> <p><i>We control our environment indoors.</i></p>	<p><i>We have no control over our environment.</i></p>

Grade 2 ESactivity004 covers:

ES3:compare characteristics of and changes in observed air conditions, in both indoor and outdoor environments (eg. cold winter temperatures outdoors and warm temperatures indoors)

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## Air and Water in the Environment

### Looking at the Different States of Water

On earth water exists in *three* states. These three states are called *solid*, *liquid* and *gas*.

Draw a picture of solid water

We see solid water  
as *ice*.

We see liquid water as *lakes*, *rivers* and *rain*.

Draw three different pictures of how we see liquid water.

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We do not see water as a gas very often because it is invisible. BUT there are two times you have seen water as a gas this year. Once in a science experiment we did in class and the other time was outside during the winter. We usually call this gas water a special name, VAPOUR.

Draw a picture of water vapour we have seen this year . . .

<i>boiling a kettle</i>	<i>our breath outside when it's cold</i>
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Grade 2 ESactivity005 covers:  
ES5: recognize that water exists in three states on earth (eg. solid - visible as ice; liquid - visible as rain or as water in lakes, streams, etc.; gas - present but invisible as water vapour)  
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## Air and Water in the Environment The Different Forms of Moisture

Forms of Moisture	Paste it...	Describe it
dew		<i>wet, drippy, found on leaves and grass in the morning.</i>
snow		<i>cold, fluffy</i>
fog		<i>misty, water droplets, usually found near lakes or oceans</i>
frost		<i>solid, patterns</i>
rain		<i>wet</i>

We see dew when water vapour evaporates from the warm ground and when it reaches COLD air it turns into liquid water creating the droplets we see on flowers and grass.

We see snow when it is cold out. During the winter the clouds are very cold. Instead of raining the liquid water turns into a special solid that we know as snow.

## We can make FOG!

This is what we need . . .

- 1) ice cubes
- 2) dish towel
- 3) rolling pin
- 4) deep cake pan with dark lining
- 5) salt
- 6) spoon

This is WHAT we do . . .

- 1) Wrap the ice cubes in the dish towel.
- 2) Crush the ice with the rolling pin.
- 3) Put the crushed ice in the cake pan.
- 4) Cover the ice with plenty of salt and stir.
- 5) Wait a few minutes.
- 6) Then breathe gently over the salted ice.

WHAT happened: \_\_\_\_\_

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## We can make FROST!

This is what we need . . .

- 1) cotton swab
- 2) petroleum jelly
- 3) crushed iced
- 4) glass
- 5) salt
- 6) spoon

This is WHAT we do . . .

- 1) Dip the cotton swab in the petroleum jelly.
- 2) Use it to paint a star on the outside of the glass.
- 3) Put the crushed ice in the glass.
- 4) Cover the ice with salt and stir.
- 5) Wait a few minutes.

WHAT happened: \_\_\_\_\_

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## We can make RAIN!

This is what we need . . .

- 1) a square cake pan with ice inside
- 2) a kettle

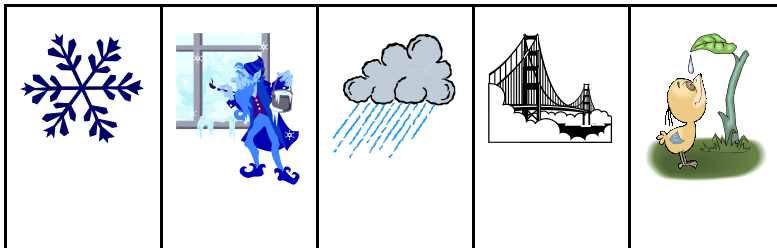
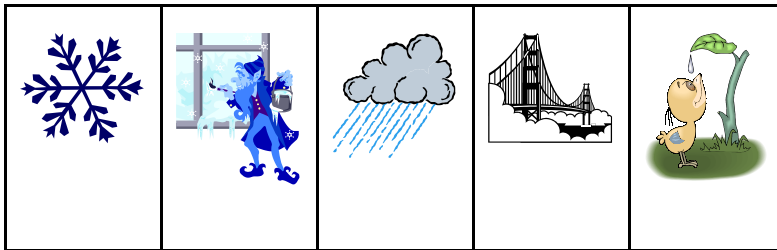
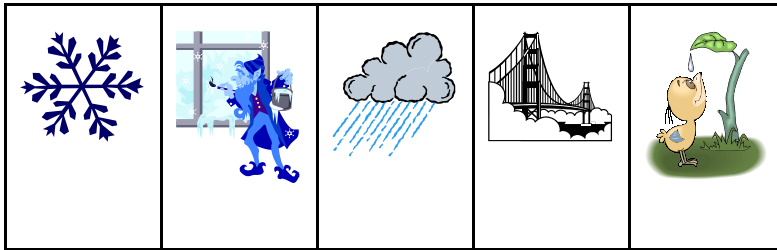
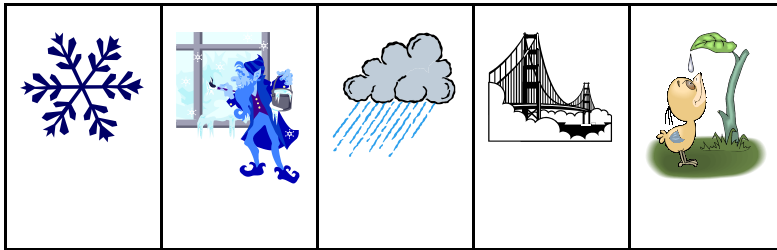
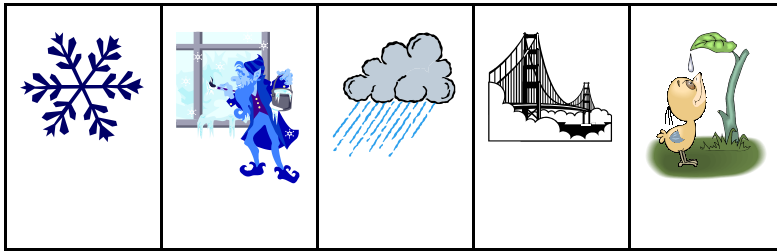
This is WHAT we do . . .

- 1) Bring the kettle to a boil.
- 2) Hold cake pan filled with ice over the boiling kettle.

WHAT happened: \_\_\_\_\_

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**\*\*Photocopy and cut into strips for students.\*\***

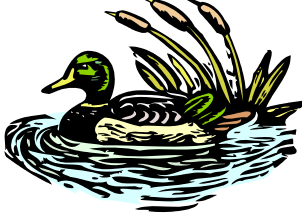


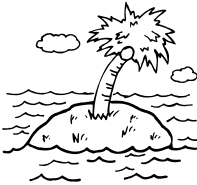



# Air and Water in the Environment

## Water Sources



Water is important for people to stay alive. There are many places where we can find water. BUT not all water sources are good to drink.

Water Source	Information
	
	
	
	
	

Grade 2 ESactivity007 covers:

ES16: identify sources of drinking water (eg. wells, springs, Great Lakes, rivers)

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**\*\*Photocopy and cut apart for students.\*\***


<p>A well is a hole dug into the ground in a spot where there is fresh water. People dig wells when they do not live around other water sources. Well water is GOOD drinking water.</p>	<p>A river is water that is always moving. Many cities and towns were built along rivers because they provide GOOD drinking water.</p>
<p>In Ontario we have several lakes that are called the Great Lakes. These lakes include, Lake Ontario, Lake Erie, Lake Superior, Lake Huron and Lake Michigan. These lakes provide GOOD drinking water for the cities around them.</p>	<p>Oceans cover 2/3 of the earth. BUT all this water is not good to drink because it is too salty.</p>
<p>Ponds are another source of water. They are not good to drink though because ponds are always still and lots of bacteria and algae like to grow there. BUT ponds make great homes for wildlife like frogs and ducks.</p>	

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## Air and Water in the Environment Using Water

As a class let's make a list of how we use water. Write the list on your special notepad below (remember to use your commas!).




*Drinking, washing ourselves,  
washing clothes, washing our  
houses, washing food . . .*

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Did you know that  $\frac{2}{3}$  of the world is covered in water. But water is still a precious resource that should not be wasted. As a class let's make a list of ways we can prevent wasting it. Write the list on your special notepad below (remember to use your commas!).



*Turning off the taps when  
brushing my teeth, scheduled time  
to water the grass, take short  
showers . . .*

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Grade 2 ESactivity008 covers:

ES15:describe the different uses of water and identify some that are essential for maintaining our health (eg. water is used for drinking and washing; clean drinking water is essential for the health of humans)

ES17:recognize that clean water is an increasingly scarce resource in many parts of the world and that the water we use is part of our environment and should be used wisely (eg. taps should be turned off while brushing teeth; toxic substances such as paint should not be poured down the drain)

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Were the oil and salt pollutants? *Yes*

What happened to the plants that were watered with pollutants in the water?

*They didn't grow as well or died.*

Do you think pollutants are bad for humans too? *Yes*

What can we do to prevent pollutants contaminating our water sources?

*We should try to reduce our use of pollutants, not pour pollutants down the drain . . .*

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Grade 2 ESactivity009 covers:

ES17: recognize that clean water is an increasingly scarce resource in many parts of the world and that the water we use is part of our environment and should be used wisely (eg. taps should be turned off while brushing teeth; toxic substances such as paint should not be poured down the drain)

ES18: demonstrate awareness of the ways in which the disposal of waste water can affect our health and the health of other living things (eg. pouring waste water containing chemicals into a lake or river can seriously harm people and the organisms that live in the water)

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## Air and Water in the Environment Experiment: GET THE DIRT OUT!!

As a class let's read The Magic School Bus at the Waterworks by Joanna Cole and Bruce Degen.

Purpose: *To create a water filter.*

### Materials:

- 1) a 2 L pop bottle cut in half
- 2) filter paper (coffee filter)
- 3) cotton balls
- 4) sand
- 5) pebbles
- 6) soil
- 7) water

### Method:

- 1) Place the top half of the pop bottle upside down into the bottom half.
- 2) Place the filter paper inside.
- 3) Put the cotton balls in.
- 4) Pour sand in.
- 5) Pour pebbles in.
- 6) Mix soil and water together.
- 7) Pour Mixture into the "filter."

What I learned . . .

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Grade 2 ESactivity010 covers:

ES17: recognize that clean water is an increasingly scarce resource in many parts of the world and that the water we use is part of our environment and should be used wisely (eg. taps should be turned off while brushing teeth; toxic substances such as paint should not be poured down the drain)

ES18: demonstrate awareness of the ways in which the disposal of water can affect our health and the health of other living things (eg. pouring waste water containing chemicals into a lake or river can seriously harm people and the organisms that live in the water)

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# Air and Water in the Environment

## The Water Cycle



As a class let's read The Magic School Bus: Wet All Over, A Book about the Water Cycle by Joanna Cole and Bruce Degen.

Definitions:

Precipitation: When it *rains* or *snows*.

Condensation: To change a *liquid* into a *solid*. For example, when water vapour turns to rain in a cloud.

Evaporation: To change a *liquid* into a *gas*. For example, when water moves into the air.

### Experiment: Watching Water Evaporate

**\*\* Try to do this experiment at the beginning of the week, otherwise there will be no experiment after the weekend - it will have evaporated with no recordings.\*\***

Purpose: *To watch how water evaporates.*

#### Materials

- 1) large paper plate
- 2) 25 mL of water
- 3) marker or pencil

#### Method:

- 1) Pour the water onto the plate.
- 2) Trace a line around the water on the plate.
- 3) Trace a new line around the water every  $\frac{1}{2}$  day.

What happened: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

## Activity: Make your own Water Cycle

### Directions:

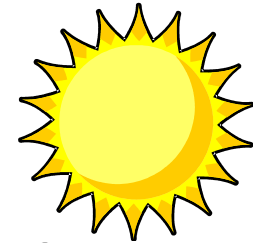
- 1) Cut the water cycle picture out of your science booklet.
  - 2) Glue the picture to construction paper.
  - 3) Cut nicely around the borders and the cut out squares.
  - 4) Colour the rain drops on the turn wheel.
  - 5) Cut the turn wheel out of your science booklet.
  - 6) Glue the turn wheel to construction paper.
  - 7) Cut nicely around the turn wheel.
  - 8) Push a paper fastener through the  $\Gamma$  on the water cycle picture.
  - 9) Push the paper fastener through the  $\Gamma$  on the turn wheel.
  - 10) Close the paper fastener (by pushing the flaps down).
  - 11) Turn the wheel and watch the water cycle!
  - 12) Label where evaporation, condensation and precipitation occur.
  - 13) Add final touches and colour to your very own Water Cycle!
- \*\*Photocopy the water cycle picture and the turn wheel on the next two pages for students.\*\***

Grade 2 ESactivity011 covers:

ES8: recognize evidence of the water cycle (eg. observe water in a closed container and water in an open container; observe puddles evaporating after a rainstorm)

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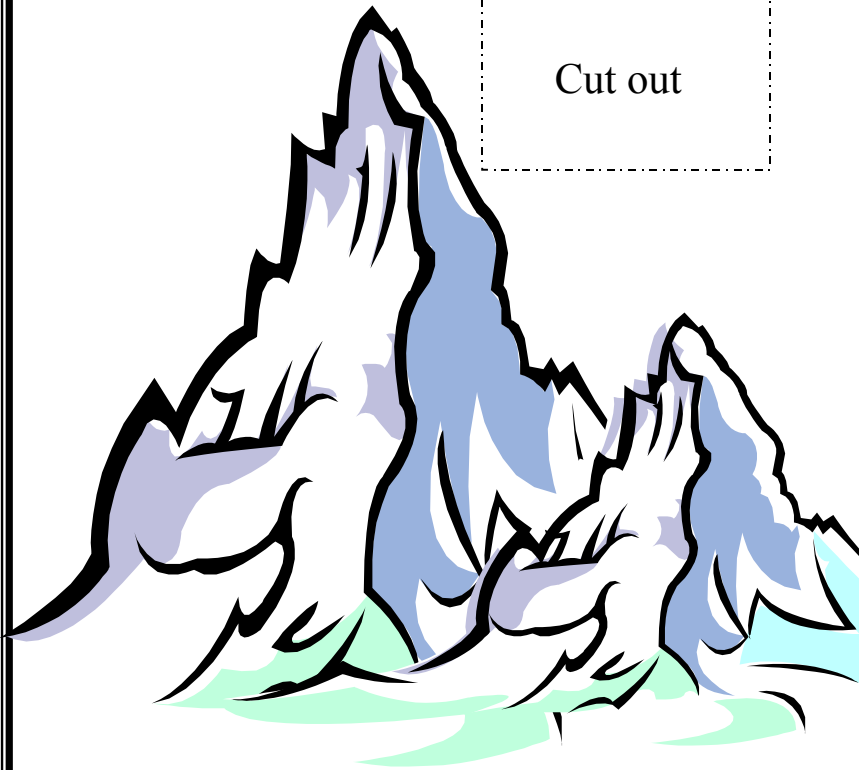
# The Water Cycle



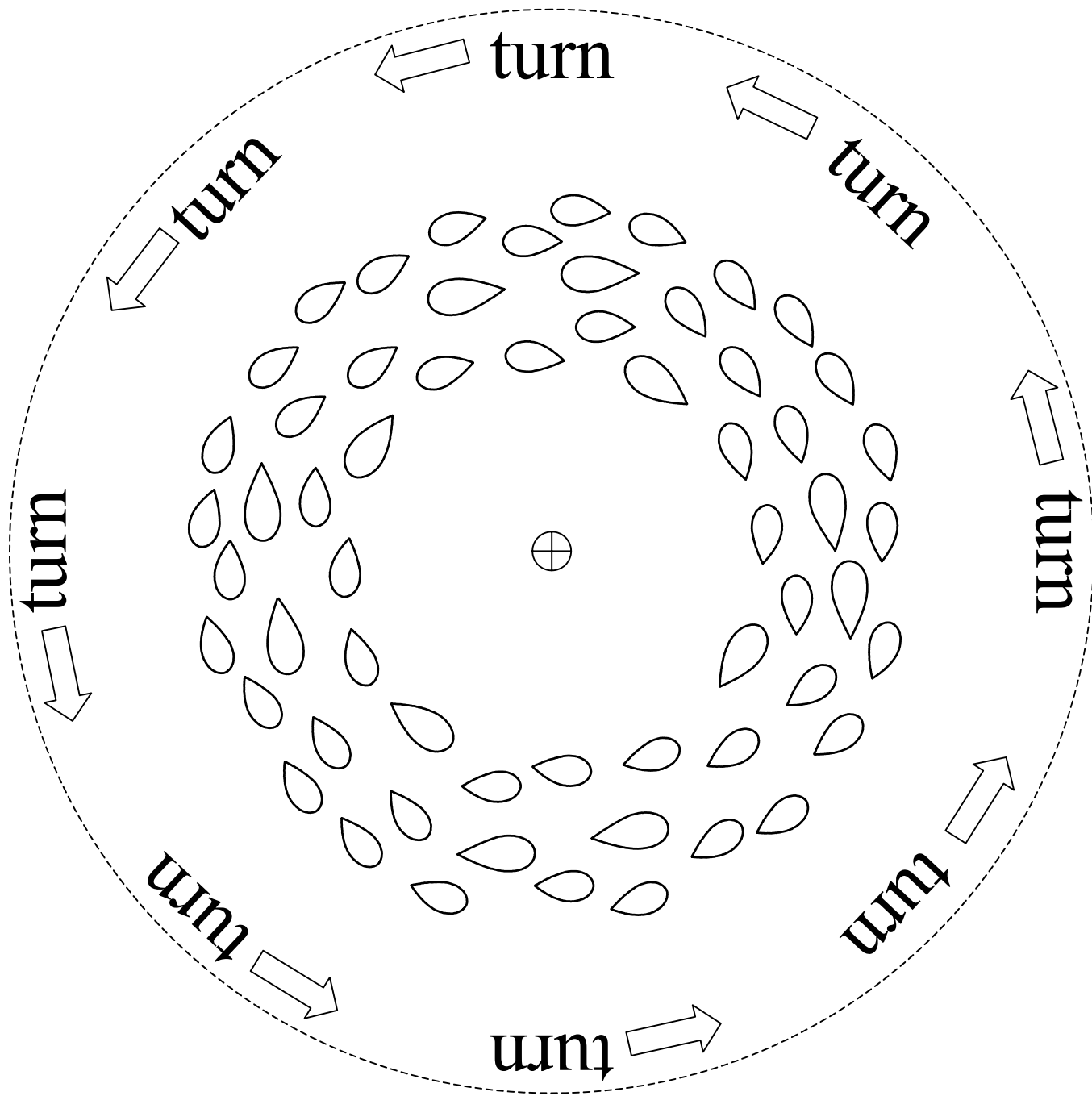
Cut out



Cut out









## Air and Water in the Environment Looking at Wind

Where do we see wind? Draw two pictures showing where you see wind.

<i>Tree branches moving</i>	<i>Clouds moving</i>
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Wind is created by *hot* air rising and *cold* air falling.

Experiment: Can we see air move?

Materials:

- 1) a piece of construction paper
- 2) a pencil
- 3) scissors
- 4) a piece of string
- 5) a lamp

Method:

- 1) With your pencil draw a spiral on the piece of construction paper.
- 2) Cut the spiral out.
- 3) Attach a string to the centre of the spiral.
- 4) Hold your cut out spiral over the lamp.

What did your spiral do? *Spins around*

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Explanation: Heat from the lamp warms the air inside the lampshade. This air is lighter than the air in the room and it “floats” up. This “floating” up or rising air makes the spiral *spin*.

Grade 2 ESactivity012 covers:

ES2:describe the movement of air relying on their observations of its effects (eg. tree branches swaying, clouds moving)

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## Air and Water in the Environment

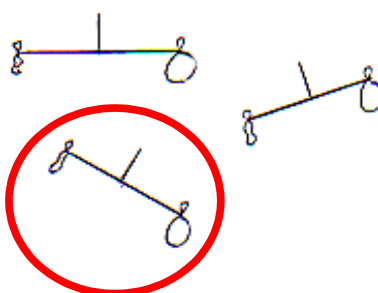
### Playing with Air

What is air? *Is a gas that surrounds us, it's underneath, above and around us. We breathe it in and out. We need it to survive.*

Does air have mass?

- 1) Take a straw and tie a string in the middle of it.
- 2) Blow up two balloons.
- 3) Attach a balloon at each end of the straw.
- 4) Draw a before picture.
- 5) Predict what will happen.
- 6) Pop one balloon.
- 7) Draw an after picture.

Circle which drawing you think is going to happen...



Draw a before picture

Draw an after picture

*correct answer circle in red above*

## Questions

- 1) Is air a substance? *Yes*
- 2) Is air a gas, a liquid or a solid? *Gas*
- 3) What colour is air? *Clear*

## Imagine . . .

Draw a picture of what you think the world would look like if air was a liquid.



## Air and Water in the Environment

### Experiment: The Drying Race

Purpose: *To find out how to dry something wet the fastest.*

#### Materials:

- 1) four dish cloths of equal size and different colours
- 2) water
- 3) a fan
- 4) a lamp
- 5) a bowl
- 6) a clothes line

#### Method:

- 1) Label each cloth.
- 2) Soak the cloths in water.
- 3) Wring each one out equally.
- 4) Hang the red cloth on the line.
- 5) Hang the yellow cloth on the line with a fan blowing on it.
- 6) Hang the green cloth on the line with a lamp shining on it.
- 7) Put the blue cloth in the bowl all bunched up.
- 8) Time how long it takes each cloth to dry.

What we saw:

Cloth	Drying Condition	Draw a picture	Time to dry
red	on the line		
yellow	with a fan		
green	with a lamp		
blue	in a bowl		

What I learned: \_\_\_\_\_



## Air and Water in the Environment

### What Materials Keep People Dry?

<p>Draw what you wear when it rains . . .</p>	<p>Draw what you wear when it snows . . .</p>
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Purpose: *To find out what materials are the best to wear when it rains.*

#### Materials

- 1) a piece of wool
- 2) a piece of cotton
- 3) a piece of paper towel
- 4) a piece of plastic wrap
- 5) 2 measuring cups
- 6) 4 elastic bands

#### Method:

- 1) Place one of the materials on the top of the measuring cup.
- 2) Put the elastic band around the material to hold it in place.
- 3) Fill a measuring cup with 15 mL of water.
- 4) Pour the water over the material.



What happened:

Material	What happened (sat on top OR soaked through)
Wool	
Cotton	
Paper towel	
Plastic wrap	

What I learned: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Using what you learned, design a new piece of clothing to wear out in the rain.

Give directions on how to make it:	Draw your new piece of clothing:
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Grade 2 ESactivity015 covers:

ES9:ask questions about and identify needs or problems arising from events in the outdoor environment, and explore possible answers and solutions (eg. observe that there is a relationship between the patterns and movement of clouds and changes in weather; monitor the length of time needed for various materials used for clothing to dry in order to determine which materials are more suitable for wet weather)

ES13:communicate the procedures and results of explorations and investigations for specific purposes, using drawings, demonstrations, and oral and written descriptions (eg. write the instructions for constructing a pinwheel, adding helpful drawings or diagrams)

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Air and Water Certificate

This certificate hereby certifies

\_\_\_\_\_

as a Grade 2 Air and Water expert.

\_\_\_\_\_  
Principal

\_\_\_\_\_  
Teacher

Share your science booklet with at least one family member at home. After you have shared complete the following:

- 1) Cut out your Air and Water Certificate.
- 2) Get the person you shared your science booklet with to fill out the form below, detach it and bring it back to school.

7 .....

\_\_\_\_\_ shared their science booklet with the following family members:

\_\_\_\_\_  
Parent's Signature



# Air and Water in the Environment

## HOMEWORK

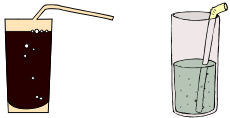
DUE: \_\_\_\_\_

Name: \_\_\_\_\_

Dear Parent or Guardian,

We are currently studying air and water in the environment in science. We have discussed how all living things need water to survive and how water is wasted. This homework sheet is to help your child realize just how important water is in their life. Please help your child record the amount of water and other liquids he or she drinks in ONE day on the first chart. On the second chart please help your child record the number of times he or she uses water during the day. On the reverse side please help your child list other uses of water in your household not mentioned.

### Chart 1

I drank . . .	How Much?? (Draw glasses full or partially full as shown to represent the amount you drank.)	
water		
juice		
milk		
pop		

### Chart 2

I used water for . . .	Number of Times (use check marks)
washing my hands	
flushing the toilet	
bathing	
showering	

# List other ways your family uses water in your house . . .

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Grade 2 EShomework covers:

ES15:describe the different uses of water and identify some that are essential for maintaining our health (eg. water is used for drinking and washing; clean drinking water is essential for the health of humans)

ES17:recognize that clean water is an increasingly scarce resource in many parts of the world and that the water we use is part of our environment and should be used wisely (eg. taps should be turned off while brushing teeth; toxic substances such as paint should not be poured down the drain)

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