Science Resource Package: Grade 5

Weather: Measuring and Describing Weather

New Brunswick Department of Education

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Acknowledgements

The Department of Education of New Brunswick gratefully acknowledges the contributions of the following groups and individuals toward the development of the New Brunswick Science Resource Package for Grade 5 *Weather: Measuring and Describing Weather*

- The Science Resource Package Development Team:
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- Science East:
    - Michael Edwards, Director of Programming
    - Karen Matheson, Director of Education
- Kathy Hildebrand, Learning Specialist, Science and Mathematics, NB Department of Education
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Note that at the time of posting, all URLs in this document link to the desired science content. If you observe that changes have been made to site content, please contact Kathy Hildebrand, kathy.hildebrand@gnb.ca, Science Learning Specialist, at the Department of Education.

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RATIONALE

This resource package models current research in **effective science instruction** and provides an **instructional plan** for one topic selected from the Grade 5 Atlantic Canada Science Curriculum. This curriculum includes STSE (Science, Technology, Society and Environment) outcomes, Skills outcomes, and Knowledge outcomes – all of which are important for building a deep understanding of science and its place in our world.

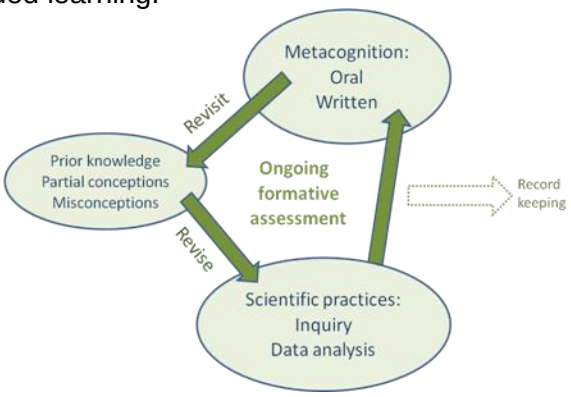
As has been true of our ancestors, we all develop "explanations" about what we observe which may or may not be valid. Once ideas are established, they are **remarkably tenacious** and an alternate explanation rarely causes a shift in thinking. To address these **misconceptions** or alternate conceptions, students must be challenged with carefully selected experiences and discussion.

A key part of this instructional plan is accessing **prior knowledge.** It is recorded in a way that it can and **will be revisited** throughout the topic. The intent is to revise, extend, and/or replace students' initial ideas with evidence-based knowledge.

Science is not a static body of facts. The process of exploring, revising, extending, and sometimes replacing ideas is central to **the nature of science**. Think of science as an **ongoing evidence-based discussion** that began before our time and that will continue after it. Science is often collaborative, and discussion plays a key role. Students' learning of science should reflect this as much as possible.

The intent of this instructional plan is to encourage a **constructivist** approach to learning. Students explore an activity, then share, discuss and reflect. The telling of content by the teacher tends to come after, as an extension of the investigation (or experience) explored by the students.

The learning is **organized into cycles**. The partial conceptions and misconceptions are revisited in each cycle so that students' ideas will be revised. Each cycle will result in deeper and/or extended learning.



Hands-on activities are part of the instructional plan. Inquiry activities tend to be most structured in the first cycle. The teacher provides the question to investigate and gives a procedure to follow. In subsequent cycles, less structure tends to be given. For example, students may be given a question and asked to develop an experimental plan which they then implement. The goal is to **move towards open inquiry** in which students generate a testable question, develop an experimental plan using available materials, implement the plan, record relevant observations, and make reasonable conclusions. The included activities are meant to start this journey.

Discussion and **written reflections** are key parts of the lessons. Discussion (both oral and written) is a vehicle that moves science forward. For example, when scientists publish their evidence and conclusions, other scientists may try to replicate results or investigate the range of conditions for which the conclusion applies. If new evidence contradicts the previous conclusions, adjustments will be required. Similarly, in this instructional plan students first **do**, then **talk**, then **write** about the concept. A section on supporting discussion is included in this resource package.

Assessment tasks are also included in the instructional plan and assess three types of science curricular outcomes: STSE, Skills, and Knowledge. These tasks are meant to be used as tools for letting the teacher and the students know **where they are** in their learning and what the **next steps** might be. For example: Has the outcome been met or is more learning required? Should more practice be provided? Is a different activity needed?

When assessment indicates that outcomes have been met, it will provide **evidence of achievement**. This evidence may be sufficient and further formal testing (paper-pencil tests) may not be required to demonstrate that outcomes have been met.

ⓘBackground Information

Portions of the Weather unit have been integrated with the "Properties and Changes in Materials" unit. This resource on weather requires time for students to make daily observations of local weather over a few weeks. It is suggested that another science unit, such as "Properties and Changes in Materials" be worked on while students are accumulating weather data.

Prior Knowledge:

- Know what temperature is and have some idea of what the numbers mean (for example, that 0°C is cold and 20°C is warm)
- Know term precipitation – snow, rain, hail, sleet
- Listen to weather reports and know about meteorologists or have their parents talk about the weather with them
- Like to talk about extreme weather

Common Misconceptions:

- Students don't know what causes the weather
- Students think tsunamis have to do with weather (instead of earthquakes)

Did You Know?

The Teacher's Guide "Weatherwise" provides background information about:

- Clouds and precipitation on page 29
- Climate and shelters around the world on page 62

The Environment Canada "Sky Watcher's Guide to Weather" contains excellent background information as well as some activities and instructions for making weather instruments. The information can be viewed online or downloaded in printable (pdf) format.
English: http://www.on.ec.gc.ca/skywatchers/guide_e.html or
French: http://www.on.ec.gc.ca/skywatchers/guide_f.html (Météo à l'oeil Le guide des météophiles)

Instructional Plan

Access Prior Knowledge

How would you describe the weather today?

What kinds of words do we use when we describe weather conditions? Start a list of words commonly used or essential to describe weather (sunny, cloudy, rainy, cold, humid, etc.). This list will be used for this activity and added to during the 1st cycle.

Have each student draw and describe one of the following:

- A hot day
- A tornado
- A wet day
- A blizzard

Students illustrating the same type of weather should share and compare their work.

What are the key elements for each type of weather?

Cross-curricular links:
ELA
2. Students will be expected to:
a) Contribute to and respond constructively in conversation, small-group and whole-group discussion, recognizing their roles and responsibilities as speakers and listeners
b) Use word choice and expression appropriate to the speaking occasion
8. Students will be expected to:
a) Use a range of strategies in writing and other ways of representing to
- record, develop, and reflect on ideas, attitudes, and opinions
- record and reflect on experiences and their responses to them
b) Expand appropriate note-making strategies from a growing repertoire (e.g., outlines, charts, diagrams)
c) Make deliberate language choices appropriate to purpose, audience, and form, to enhance meaning and achieve interesting effects in imaginative writing and other ways of representing

✓ **Assessment:**
Note the concepts and misconceptions students are expressing. You will need to know these to plan effective questions for subsequent activities and discussions so that students will examine and adjust their alternate conceptions.

Post student versions of curricular outcomes on chart paper (see page 17).
Inform students that these outcomes will be addressed over the next portion of the unit. Point out to students which outcomes are being addressed in each activity.

1st Cycle

✪ Curriculum Outcomes

(Blue outcomes are in the French Immersion curriculum but not in the English compacted curriculum)

104-4 Compare the results of their investigations to those of others and recognize that results may vary
104-7 Demonstrate the importance of using the languages of science and technology to communicate ideas, processes, and results
107-2 Describe and compare tools, techniques, and materials used by different people in their community and region to meet their needs
204-8 Identify appropriate tools, instruments, and materials to complete their investigations
205-4 Select and use tools for measuring
205-7 Record observations using single words, notes in point form, sentences, simple diagrams and charts
205-10 Construct and use devices for a specific purpose
205-8 Identify and use a variety of sources and technologies to gather pertinent information
206-2 Compile and display data, by hand or by computer, in a variety of formats including frequency tallies, tables, and bar graphs
206-3 Identify and suggest explanations for patterns and discrepancies in data
300-13 Describe weather in terms of temperature, wind speed and direction, precipitation, and cloud cover
302-11 Describe key features of a variety of weather systems (revisiting prior knowledge)
301-13 Relate the constant circulation of water on Earth to the processes of evaporation, condensation, and precipitation

Ask students to watch the weather on television or look up a weather forecast online. *What kinds of information do meteorologists use when talking about weather?*

Refer back to the list of words students made during the Activating Prior Knowledge activity to show students that meteorologists use words commonly used like sunny, cloudy, etc., but they also use scientific words like precipitation, pressure, and snow flurries, to be more precise about current and predicted weather.

Activity – Measuring Weather

1st Step: Making weather instruments

How do meteorologists (and other people) know what the weather is going to be today or tomorrow? (They use instruments to measure and predict, based on measurements, what it will likely be like).

Show students pictures of weather instruments used by professional meteorologists. Talk about how the instruments they will use are “lower tech” but ultimately work on

exactly the same scientific principles. The Environment Canada website takes students on a virtual tour of weather instruments
http://www.on.ec.gc.ca/skywatchers/ontario/wx_office_tour/compound/compound_e.html

and the weather office.
http://www.on.ec.gc.ca/skywatchers/ontario/wx_office_tour/compound/compound_e.html

Put students into groups to construct these weather instruments: barometer, anemometer, rain gauge, wind streamer. See page 18 for links and further information.

They will use these instruments to make observations in addition to online resources.

Materials:

The materials listed below are for the simplest versions of the weather instruments. Additional materials may be listed on the activity sheet from Environment Canada.

Barometer
- Glass jars
- Balloons
- Straws
- Food colouring
- Rubber band
- Tape
- Ruler or index card
- Chewing gum

Rain gauge
- Ruler
- Can

Anemometer (wind speed)
- Photocopy of a protractor (for measuring angles) on cardstock
- Styrofoam or ping pong ball or wad of foil
- String

Wind streamer/sock
- Paper plate
- Streamers

Observation journal

Cross-curricular links:
ELA
2. Students will be expected to:
a) Contribute to and respond constructively in conversation, small-group and whole-group discussion, recognizing their roles and responsibilities as speakers and listeners
b) Use word choice and expression appropriate to the speaking occasion

8. Students will be expected to:
a) Use a range of strategies in writing and other ways of representing to
- record, develop, and reflect on ideas, attitudes, and opinions
- record and reflect on experiences and their responses to them
b) Expand appropriate note-making strategies from a growing repertoire (e.g., outlines, charts, diagrams)
c) Make deliberate language choices appropriate to purpose, audience, and form, to enhance meaning and achieve interesting effects in imaginative writing and other ways of representing

2nd Step: Collecting weather data

Four types of weather data will be recorded:

A. Daily local measurements using student-made instruments
B. Daily local or close to local measurements using an online source
C. Daily measurements at an alternate world location using an online source
D. Hourly measurements for all locations for one day only

Details are below. Note that the first three types are collected over the same 2-3 week period.

Recording information:
Information obtained from weather instruments, the website with local weather, as well as readings from each of their cities can be attached to a map or large chart where everyone can see it. All information should have a date and time.

A: Daily measuring with student-made instruments

You may have one student from each instrument group record the data from their instrument each day, or you may have students take readings from all the instruments each day.

As a class, review how to use each instrument and record results. This allows the students to see all of the instruments and understand how all of these instruments together provide a more complete view of the weather. If observers will be changing, care must be taken to have all of the readings from each instrument done in the same way for consistency (like doing a fair test).

ⓘ Teacher note: The information about each instrument should be very brief. For example, the wind speed measures the speed of the wind and if there are gusts of wind; the barometer measures changes in air pressure (they will have talked about air pressure as part of the Properties and Changes unit).

Measurements should be taken and recorded for 2-3 weeks. This would be a good time to continue work on another part of this unit or another unit.

B: Daily online weather readings for your local or close to local site

One group or person can be tasked with looking up weather data online for your location.

This website provides a link to school weather stations around New Brunswick. Not all weather stations are online, but you may be able to find one near you.
http://bbt.nbed.nb.ca/weather/index.html

Another resource for weather measurements is the Environment Canada website http://www.weatheroffice.gc.ca/canada .

C: Daily online readings for other locations

Use a world map to ask students where they think the weather may be quite different from New Brunswick weather. Assign a different city from another country to each of the groups.

ⓘ Teacher Note: If choosing a city in the southern hemisphere, you may require a quick explanation of how seasons are reversed from ours in the southern hemisphere (i.e. Australia is heading into summer as we head into winter).

ⓘ Teacher Note: If teaching French immersion, you can also choose a city in southern Quebec or Ontario. This will be useful when talking about predicting patterns of change in local weather conditions (301-14 and 204-3) since our weather typically moves in from the west/southwest.

Help students find their chosen city on a map to provide a context of where their city is and ask them to predict what kind of weather they would expect to find there. Students will also be responsible for collecting weather data for their city and recording that information.

For foreign cities, they can use the local time in that city since that is the time that would likely be posted on a website they use to find local conditions. The following website provides links to weather in different countries
http://news.bbc.co.uk/weather/forecast/2990

D: Hourly measurements using instruments and readings from online sources

Pick one day out of the observation period where weather conditions are recorded hourly for all of the locations. The changes in conditions over a day will reinforce the idea that weather is dynamic.

3rd Step: Graphing results

Have students graph temperatures from the daily measurements taken in your location from their weather instruments or from the online source. This can also be done for other reading such as barometric pressure, precipitation, wind speed, etc.

Also have them draw a graph of temperatures for the “full day” observations. These graphs will be used during the discussion to show that weather is dynamic and changes throughout the day.

✓ **Assessment:**
During the student activity, make notes on outcomes (or parts of outcomes) you observe being addressed. Process skill outcomes are part of the curriculum and should be assessed. Using the observation chart or the checklist (see pages 19-23) on a clipboard may be helpful to you. Develop your own code for quick notes.

A suggested code:
√ observed and appropriate,
WD with difficulty,
A absent.

This chart may be used on multiple days, using a different coloured pen or pencil each day and putting the date in the corner. You may not have a symbol or note for every child every day. Some teachers like to focus on a group or two each time. However you choose to make note of your observations, you will always have a sense of who you need to take more notice of and who might need extra support. The information will also help you when it is reporting time.

Reflection: Class Discussion

Remind your class about respectful discussion. The discussion tips on pages 14-15 may be helpful.

For your location, compare readings from their instruments to those from online sources. *Why, if any, are there differences between your instrument readings and online information?* (Student instruments are less sensitive; the location of the monitoring station may affect readings. For example: it may be on a hill vs. in a valley like the school; or in field away from buildings and people vs. near a building that gives off heat.)

Do you remember if the weather stayed the same all day from the time you took your reading with your weather instruments or looked it up online? How did it change over the day?

What did you notice when you did observations all day?

Use the graphs of the temperatures to show that weather is dynamic and changes throughout the day. Making observations once per day provides a look at weather happening right at that moment, but not a very accurate picture of future weather.

Cross-curricular links:
ELA
1. Students will be expected to:
a) Contribute thoughts, ideas, and experiences to discussions, and ask questions to clarify their ideas and those of their peers
c) Explain and support personal ideas and opinions
2. Students will be expected to:
a) Contribute to and respond constructively in conversation, small-group and whole-group discussion, recognizing their roles and responsibilities as speakers and listeners
b) Use word choice and expression appropriate to the speaking occasion
3a. Students will be expected to:
Demonstrate an awareness of the needs, rights, and feelings of others by listening attentively and speaking in a manner appropriate to the situation

MATH
SP1: Differentiate between first-hand and second-hand data.

Is it possible to estimate weather readings without using instruments and just going outside? (They should be able to provide an idea of the temperature, for example 0°C vs. 20°C, if it's windy, precipitation).

Refer to readings from different cities, ask students what the weather would probably feel like there (for example, cold, windy, rainy, etc.).

Water cycle

In Properties and Changes, students will have briefly talked about water changing states and how it relates to the water cycle. The vocabulary and idea of the water cycle should be reviewed here. Cities that have experienced precipitation during the measuring period can be used to reinforce the idea of evaporation, condensation and precipitation.

The video "The Water Cycle" from http://learning.aliant.net/ may be useful in reviewing the water cycle. You may wish to only use selected portions of the video.

To access the video, type the title into the search box. Videos are available free of charge at this site. You will need to register, however registration is free. If you try to watch the video without logging in, you will be prompted to do so. Note that a table of contents opens beside the video so that you may select only certain sections for viewing if you wish. There is also the option to watch the video full screen.

Revisit information on the chart from the Accessing Prior Knowledge activity (on page 4). Ask: *Is there anything that should be added to or revised? Is there other information we could add? (e.g., temperatures, rain or snow, wind speeds, etc.)*

Reflection: Journaling

You are going on a trip from your home to Mexico in December. The weather report for your area says the highest temperature for today will be -10°C with winds coming from the north at 50 km/hr. The weather report for Mexico says 15°C and winds coming from the south at 5 km/hr. What will you wear when you leave your house and why? What will you pack for Mexico?

Cross-curricular links:
ELA
8. Students will be expected to:
a) Use a range of strategies in writing and other ways of representing to
- record, develop, and reflect on ideas, attitudes, and opinions
- record and reflect on experiences and their responses to them
c) Make deliberate language choices appropriate to purpose, audience, and form, to enhance meaning and achieve interesting effects in imaginative writing and other ways of representing

✓ **Assessment:**

Journal entries should not receive a score or mark. A positive comment followed by a question to refocus attention or suggest the next step in learning is very effective.

Take note of which students explain they would dress warmly in NB since it is cold and windy outside, but bring spring/summer like clothes for Mexico.

Possible extensions:

- Students can investigate whether there is a relationship between crickets chirping and the temperature.

- Students can study the Beaufort scale, an observation of wind in trees and other surroundings to determine wind strength. Environment Canada uses a similar scale when giving marine conditions. http://www.qc.ec.gc.ca/meteo/secrets_stlaurent/beaufort_scale_e.htm

- Students can explore the water cycle using the “Droplet and the Water Cycle” game at http://kids.earth.nasa.gov/droplet.html

2nd Cycle

✪ Curriculum Outcomes

(Blue outcomes are in the French Immersion curriculum but not in the English compacted curriculum)

107-2 Describe and compare tools, techniques, and materials used by different people in their community and region to meet their needs

107-14 Identify scientific discoveries and technological innovations of people from different cultures

205-8 Identify and use a variety of sources and technologies to gather pertinent information

300-13 Describe weather in terms of temperature, wind speed and direction, precipitation and cloud cover

Activity – Technological innovations due to weather

Have students choose a city and determine the type of weather experienced in that city. This can be done in groups, pairs or individually, using cities they will be familiar with from the 1st cycle, from friends or family, or a city they are interested in learning about.

Have students focus on one or two features such as precipitation or temperature and research innovations (inventions) that have come about as a result of the weather experienced in their chosen city.

Examples include:

-Amount of and/or type of precipitation results in umbrellas, shovels, sloped roofs, thatched roofs

- Range of temperature results in type of house structure and/or construction material such as mud houses, stucco walls

Student reports should include:

- A map showing the location of their city
- 1 or 2 pictures of their city
- A picture that shows the innovation or invention
- A description of the weather and how it is related to the innovation/invention they have chosen.

Cross-curricular links:

ELA

4. Students will be expected to:
 a) select, independently, texts appropriate to their interests and learning needs
 c) use pictures and illustrations, word structures, and text features to locate topics and obtain or verify their understanding of information

5a. Students will be expected to answer, with increasing independence, their own questions and those of others by selecting relevant information from a variety of texts

8. Students will be expected to:
 a) Use a range of strategies in writing and other ways of representing to
 - record, develop, and reflect on ideas, attitudes, and opinions
 b) Expand appropriate note-making strategies from a growing repertoire (e.g., outlines, charts, diagrams)

10. Students will be expected to:
 a) Use a range of prewriting, drafting, revising, editing, proofreading, and presentation strategies
 b) Demonstrate an increasing understanding of the conventions of written language in final products
 c) Use technology with increasing proficiency to create, revise, edit, and publish texts
 e) Select, organize, and combine relevant information, from three or more sources to construct and communicate meaning

SOCIAL STUDIES

5.2.2 Describe how place and environment affected, and were affected by, the lifestyles of an ancient society

Reflection: Class Discussion

Remind your class about respectful discussion. The discussion tips on pages 14-15 may be helpful.

Students can present their findings to class members orally and/or in the form of a short report that can be displayed in the class or in the hallway.

Revisit information on the chart from the Accessing Prior Knowledge activity (on page 4). Ask: *Is there anything that should be added to or revised? Is there other information we could add?*

Think like a scientist

Asking good questions is an important skill in science. Initially students will need support. Model the skill with the whole class and students will begin to have the confidence to contribute. After some practice, students will be able to generate questions successfully individually.

Cross-curricular links:
ELA
8a. Students will be expected to:
Use a range of strategies in writing and other ways of representing to
- frame questions and answers to those questions

Present students with a situation and ask them to generate questions that could be investigated scientifically. (These situations and questions do not have to be limited to those that can be done in a classroom.)

Situation:

> Scientists believe the Earth is gradually getting warmer every year. This is leading to changes in weather, such as more severe weather, for example more tornados, during the summer in North America.

What is one question concerning the Earth warming and changes in weather that could be investigated scientifically?

For example:

> How many more tornados are being recorded than in other years?
> Are temperatures warming in all locations on Earth?

Supporting Class Discussion

No one person is as smart as all of us together.

Page Keeley, in the book "Science Formative Assessment" (2008), uses the analogy of ping-pong and volleyball to describe discussion interaction. Ping-pong represents the back and forth question-answer pattern: the teacher asks a question, a student answers, the teacher asks another question, a student answers, and so on. Volleyball represents **a different discussion pattern**: the teacher asks a question, a student answers, and other students respond in succession; each building upon the previous student's response. Discussion continues until the teacher "serves" another question.

A "volleyball" discussion encourages **deeper student engagement** with scientific ideas. Students state and **give reasons** for their ideas. Through the interaction, ideas may be challenged and clarified. Extensions and applications of ideas may arise as well. Discussions should **avoid the personal** and always revolve around **ideas, explanations and reasons.** The goal is for students to achieve better understanding.

Share the ping-pong and volleyball analogies with your students. Good discussion **takes practice**. You and your students will improve. Many teachers find discussion works best if all students can see each other, such as in a circle, at least until they become accustomed to listening and responding to each other.

As the teacher, you will need to:

- establish and maintain a respectful and supportive environment;
- provide clear expectations;
- keep the talk focused on the science;
- carefully orchestrate talk to provide for equitable participation.

It is important to **establish discussion norms** with your class. Your expectations may include:

- Everyone has a right to participate and be heard.
- Everyone has an obligation to listen and try to understand.
- Everyone is obliged to ask questions when they do not understand.
- The speaker has an obligation to attempt to be clear.

At first, discussions are apt to seem somewhat artificial. Initially, a bulletin board featuring cartoon talk bubbles with suggested sentence starters may be helpful.

I respectfully disagree . . .
I had a different result . . .
Could you show how you got that information?
When I was doing ___, I found that . . .
Even though you said ___, I think . . .
The data I have recorded in my notebook is different from what you shared. I found . . .

It is helpful if **teacher questions refer to a big idea** rather than specifics. (Could humans and chickens move their bones without muscles?) Questions should be phrased so that anyone can enter into the conversation. Opinion questions are especially good for this (What do you think . . . ?
How do you think . . . ? What if . . . ? Why . . . ?).

Provide plenty of **wait time** for students. Students give more **detailed and complex answers** when given sufficient wait time. Allow wait time after student responses. When students are engaged and thinking, they need time to process other responses before contributing. If the discussion is not progressing, have students engage in **partner talk**. Partner talk enables the teacher the opportunity to insert "overheard" ideas.

Helpful teacher prompts:

1. What outcome do you predict?
2. Say more about that.
3. What do you mean by . . . ?
4. How do you know?
5. Can you repeat what ____ said in another way?
6. Does anyone agree or disagree with . . . ?
7. Does anyone want to add to or build on to . . . ?
8. Who understands ___'s idea and can explain it in their own words?
9. Let me see if I have got your idea right. Are you saying . . . ?
10. So you are saying that . . .
11. What evidence helped you to think that?
12. Okay, we do not agree. How does each position fit the evidence? What else could we find out?

References:

Keeley, Page (2008). *Science Formative Assessment.* Thousand Oaks, CA: Corwin Press and Arlington, VA: NSTA Press

Michaels, Sarah, Shouse,Andrew W., and Schweingruber, Heidi A. (2008). *Ready, Set, SCIENCE!* Washington, DC: The National Academies Press

Materials List

Glass jars
Balloons
Straws
Food colouring
Chewing gum
Rubber band
Ruler or index card
Ruler
Can
Photocopy of a protractor (for measuring angles) on cardstock
Styrofoam or ping pong ball or wad of foil
String
Paper plate
Streamers

Grade 5 Science kits given to schools contain:

1 barometer
7 thermometers
7 spring scales
7 stop watches
2 graduated cylinders – 100mL
Clear aquarium tubing – about 120 cm

Student Version of Outcomes

(Blue outcomes are in the French Immersion curriculum but not in the English compacted curriculum)

104-4 I will compare the results of my investigations with those of others and recognize that results may be different.

104-7 I will use scientific terms to share ideas, procedures, and results.

107-2 I will describe and compare tools, methods, and materials used by different people in their community to meet their needs.

107-14 I will identify scientific discoveries and inventions of people from different cultures.

204-8 I will identify tools, instruments, and materials that can be used to complete my investigations.

205-4 I will choose and use tools for measuring.

205-7 I will record observations using single words, notes in point form, sentences, simple diagrams and charts.

205-8 I will gather information from a variety of sources.

205-10 I will make and use devices for a specific purpose.

206-2 I will compile and display data, by hand or by computer, in a variety of formats including frequency tallies, tables, and bar graphs.

206-3 I will identify and suggest explanations for patterns and discrepancies in data.

300-13 I will describe the weather using temperature, wind speed and direction, precipitation, and cloud cover.

302-11 I will describe important characteristics of different types of weather.

301-13 I will explain the water cycle using the words evaporation, condensation and precipitation.

Return to Accessing Prior Knowledge

Making Weather Instruments

Barometer:

http://www.on.ec.gc.ca/skywatchers/teachersGuide/tg_pdf/08_activity_e.pdf See page 3.

Another version of a barometer is to use a glass jar, a straw, one piece of gum or play dough and a ruler. Fill the jar about ½ full with water. Add a few drops of food colouring. Chew a piece of gum while you dip the straw into the water and place your finger over the end of the straw to keep about 5 cm of water in the straw. Place the chewing gum on the end of the straw (try to keep the water in the straw). Now place the straw in the jar, leaving ½-1 cm between the bottom of the straw and the bottom of the jar. Tape a ruler next to the straw. It can be inside or outside the jar as long as the level of liquid in the straw can be measured easily.

Anemometer (wind speed):

http://www.on.ec.gc.ca/skywatchers/teachersGuide/tg_pdf/08_activity_e.pdf See page 5.

The ping pong ball can be substituted with a Styrofoam ball or a wad of foil. It just needs to be something with a bit of weight that will blow in the wind.

Wind streamer:

http://www.on.ec.gc.ca/skywatchers/teachersGuide/tg_pdf/08_activity_e.pdf See page 6.

Rain Gauge:

http://www.on.ec.gc.ca/skywatchers/teachersGuide/tg_pdf/08_activity_e.pdf See page 12.

Return to 1st cycle

Observation Chart Sheet

Outcomes:

name	**name**	**name**	**name**	**name**
name	**name**	**name**	**name**	**name**
name	**name**	**name**	**name**	**name**
name	**name**	**name**	**name**	**name**
name	**name**	**name**	**name**	**name**
name	**name**	**name**	**name**	**name**

Checklist Sheet

Outcomes	Correlations with Cycles	Yes	No
STSE			
104-4 Compare the results of their investigations to those of others and recognize that results may vary	1st cycle: Measuring weather activity; discussion		
104-7 Demonstrate the importance of using the languages of science and technology to communicate ideas, processes, and results	1st cycle: Measuring weather activity; discussion; journal		
107-2 Describe and compare tools, techniques, and materials used by different people in their community and region to meet their needs	1st cycle: Measuring weather activity 2nd cycle: Research activity; discussion		
107-14 Identify scientific discoveries and technological innovations of people from different cultures	2nd cycle: Research activity; discussion		
SKILLS			
204-8 Identify appropriate tools, instruments, and materials to complete their investigations	1st cycle: Measuring weather activity		
205-4 Select and use tools for measuring	1st cycle: Measuring weather activity		
205-7 Record observations using single words, notes in point form, sentences, simple diagrams and charts	1st cycle: Measuring weather activity		
205-8 Identify and use a variety of sources and technologies to gather pertinent information	1st cycle: Measuring weather activity; discussion 2nd cycle: Research activity; discussion		
205-10 Construct and use devices for a specific purpose	1st cycle: Measuring weather activity		
206-2 Compile and display data, by hand or by computer, in a variety of formats including frequency tallies, tables, and bar graphs	1st cycle: Measuring weather activity		
206-3 Identify and suggest explanations for patterns and discrepancies in data	1st cycle: Discussion		
KNOWLEDGE			
300-13 Describe weather in terms of temperature, wind speed and direction, precipitation, and cloud cover	1st cycle: Measuring weather activity; discussion; journal 2nd cycle: Research activity; discussion		
302-11 Describe key features of a variety of weather systems	Prior Knowledge Activity 1st cycle: Measuring weather activity; discussion		
301-13 Relate the constant circulation of water on Earth to the processes of evaporation, condensation, and precipitation	1st cycle: Measuring weather activity; discussion		

Checklist Sheet – Weather Outcomes in the Properties and Changes Resource Package

Outcomes	Correlations with Cycles	Yes	No
STSE			
104-4 Compare the results of their investigations to those of others and recognize that results may vary	3rd cycle: Discussion		
104-7 Demonstrate the importance of using the languages of science and technology to communicate ideas, processes, and results	3rd cycle: Discussion; journal		
SKILLS			
205-4 Select and use tools for measuring	3rd cycle: Activity – Gases (Air)		
205-7 Record observations using single words, notes in point form, sentences, simple diagrams and charts	3rd cycle: Activity – Gases (Air)		
206-3 Identify and suggest explanations for patterns and discrepancies in data	3rd cycle: Discussion		
KNOWLEDGE			
301-13 Relate the constant circulation of water on Earth to the processes of evaporation, condensation, and precipitation	4th cycle: Discussion		
300-14 Describe situations that demonstrate air takes up space, has weight, and expands when heated	3rd cycle: Discussion; journal		

Observation Checklist

names	104-4 Compare the results of their investigations to those of others and recognize that results may vary	104-7 Demonstrate the importance of using the languages of science and technology to communicate ideas, processes, and results	107-2 Describe and compare tools, techniques, and materials used by different people in their community and region to meet their needs	107-14 Identify scientific discoveries and technological innovations of people from different cultures	204-8 Identify appropriate tools, instruments, and materials to complete their investigations	205-4 Select and use tools for measuring	205-7 Record observations using single words, notes in point form, sentences, simple diagrams and charts	205-8 Identify and use a variety of sources and technologies to gather pertinent information	205-10 Construct and use devices for a specific purpose	206-2 Compile and display data, by hand or by computer, in a variety of formats including frequency tallies, tables, and bar graphs	206-3 Identify and suggest explanations for patterns and discrepancies in data	300-13 Describe weather in terms of temperature, wind speed and direction, precipitation, and cloud cover	302-11 Describe key features of a variety of weather systems	301-13 Relate the constant circulation of water on Earth to the processes of evaporation, condensation, and precipitation

Observation Checklist – Weather Outcomes in the Properties and Changes Resource Package

names	104-4 Compare the results of their investigations to those of others and recognize that results may vary	104-7 Demonstrate the importance of using the languages of science and technology to communicate ideas, processes, and results	205-4 Select and use tools for measuring	205-7 Record observations using single words, notes in point form, sentences, simple diagrams and charts	206-3 Identify and suggest explanations for patterns and discrepancies in data	301-13 Relate the constant circulation of water on Earth to the processes of evaporation, condensation, and precipitation	300-14 Describe situations that demonstrate air takes up space, has weight, and expands when heated

Student Record

Outcome goal	Evidence
STSE	
I can compare the results of my investigations with those of others and recognize that results may be different. (104-4)	
I can use scientific terms to share ideas, procedures, and results. (104-7)	
I can describe and compare tools, methods, and materials used by different people in their community to meet their needs. (107-2)	
I can identify scientific discoveries and inventions of people from different cultures. (107-14)	
SKILLS	
I can identify tools, instruments, and materials that can be used to complete my investigations. (204-8)	
I can choose and use tools for measuring. (205-4)	
I can record observations using single words, notes in point form, sentences, simple diagrams and charts. (205-7)	
I can gather information from a variety of sources. (205-8)	
I can compile and display data, by hand or by computer, in a variety of formats including frequency tallies, tables, and bar graphs. (206-2)	
I can identify and suggest explanations for patterns and discrepancies in data. (206-3)	
I can make and use devices for a specific purpose. (205-10)	
KNOWLEDGE	
I can describe the weather using temperature, wind speed and direction, precipitation, and cloud cover. (300-13)	
I can describe important characteristics of different types of weather. (302-11)	
I can explain the water cycle using the words evaporation, condensation and precipitation. (301-13)	

Student Record – Weather Outcomes in the Properties and Changes Resource Package

Outcome goal	Evidence
STSE	
I can compare the results of my investigations with those of others and recognize that results may be different (104-4)	
I can use scientific terms to share ideas, procedures, and results (104-7)	
SKILLS	
I can choose and use tools for measuring (205-4)	
I can record observations using single words, notes in point form, sentences, simple diagrams and charts (205-7)	
I can suggest reasons for patterns and differences in data (206-3)	
KNOWLEDGE	
I can describe situations that demonstrate air takes up space, has weight, and expands when heated (300-14)	
I can explain the water cycle using the words evaporation, condensation and precipitation (301-13)