



centre de
développement
pédagogique
*pour la formation générale
en science et technologie*

My country is Winter



GUIDE

CYCLE 3 of ELEMENTARY

Spring 2013

Thanks to

- Lorraine Trudel and Annie A. Alaku, pedagogical counselors, Commission scolaire Kativik
 - The idea from which this LES was born emerged during collaboration in the spring of 2012.
- Yvan Lévesque, pedagogical counselor, Commission scolaire des Rives-du-Saguenay
 - The LES was tested by SSRS teachers (their names will be added later) in the spring of 2013.
- Zoo sauvage de St-Félicien
 - For allowing us to use the pictures of the black bear, the common seal and the snowy owl.

For linguistic review, in French:

- Lucie Brouillette

For English translation :

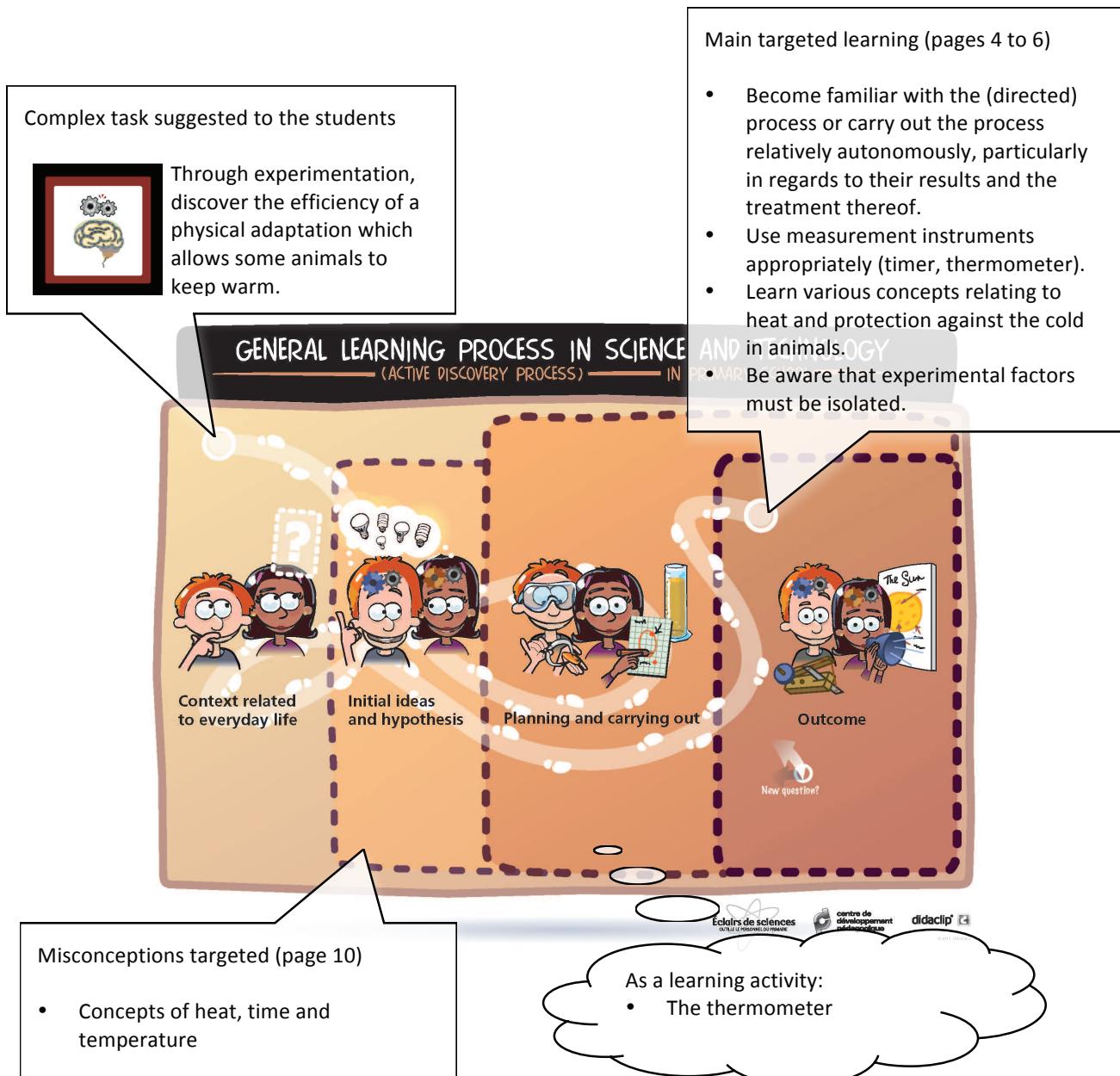
- Christine Tansey

Note:

For the purposes of brevity, the masculine form has been used.

A quick glance at *My country is Winter*

This LES was designed to support cycle 3 teachers in the appropriation of the general learning process in science and technology in elementary school. This appropriation will occur while the task is carried out with the students. The theme allows certain concepts from the *Progression of Learning* to be acquired, many of which pertain to living things, within the framework of a complex task where the student will have to carry out a scientific experiment.



My country is Winter
Science and technology – Cycle 3
Overview

Pedagogical aims

This learning situation allows the student to:

- Implement the general learning process in science and technology in elementary school. This process targets the appropriation of a problem resolution process within a context.
- Discover the importance and the complexity of isolating experimental factors.
- Recognise that certain characteristics allow animals to adapt to their environment.

Estimated time: 150 minutes and short research project as homework (to be validated).

Broad area of learning

Environmental awareness and consumer rights and responsibilities

- Awareness of his/her environment: sensitivity to the natural and human environment, understanding of certain characteristics and phenomena of his/her environment, spatial representation (orientation, location, drawing, map, etc.), identification of connections between elements characteristic of the local or regional environment or a season, awareness of interdependence between the environment and human activity.

Competencies

- To propose explanations for or solutions to scientific or technological problems
- To make the most of scientific and technological tools, objects and procedures
- To communicate in the languages used in science and technology

Statements from the *Progression of Learning* (Cycle 3 of elementary)

As a complement to the statements below, a lexicon and complementary references have been added on pages 6 and 7.

Legend:

*: Worked on during the LES

Ʊ: Previous cycle(s)

+: Optional

Material World

- Ʊ A.1.e. Describes the shape, colour and texture of an object or a substance (Cycle 2)
- * A.1.j. Describes various other physical properties of an object, a substance or a material
- + B.1.b. Identifies sources of energy in his/her environment
- * B.2.a. Distinguishes between substances that are thermal conductors and those that are thermal insulators
- * B.3.c. Explains the insulating properties of various substances

Earth and Space

- + B.2.a. Describes methods for transmitting thermal energy (e.g. radiation, convection, conduction)
- ⌚ D.4.b. Explains the sensations experienced (hot, cold, comfortable) with regard to temperature measurements (Cycle 1).

Living Things

- ★ A.1.b. Describes activities connected to the metabolism of living things (transformation of energy, growth, maintenance of systems and body temperature)
- ⌚ D.1.a. Describes the physical characteristics that demonstrate how animals adapt to their environment (Cycle 1)
- ⌚ D.1.f. Explains how animals and plants adapt to increase their chances of survival (Cycle 2)
- ★ E.2.a Appropriately uses simple measuring instruments (e.g. rulers, dropper, graduated cylinder, balance, thermometer)
- ★ F.1.a. Appropriately uses terminology related to an understanding of living things
- ★ F.1.b. Distinguishes between the meaning of a term used in a scientific or technological context and its meaning in everyday language
- ★ F.2.a Communicates using appropriate types of representations that reflect the rules and conventions of science and technology (e.g. symbols, graphs, tables, drawings, sketches)

Strategies

- Exploration strategies
 - Putting forward hypotheses (e.g. individually, as a team, as a class)
 - Taking into account the constraints involved in solving a problem or making an object (e.g. specifications, available resources, time allotted).
- Instrumentation strategies
 - Resort to consignment tools (e.g. diagram, graph, protocol, note book or log book).

Evaluation of learning

The evaluation criteria as well as elements promoting the understanding of the criteria related to the suggested activities are integrated into the student booklet. Since this is a task within a context, calling upon the production of a process, all the criteria may be used for feedback by the teacher.

When an activity presented in the booklet is very structured by the teacher (methods imposed), the criteria are presented in grey in the student booklet. This indicates that it is not recommended to evaluate the student on this element.

Interdisciplinary links

In mathematics

This LES enables the teacher to work a part of the field of statistics, for the collection, organisation interpretation and representation of data.

Statistics

2. Collect, describe and organise data (classify or categorise) using tables
3. Interpret data using
 - c. table, a bar graph a pictogram graph, a broken line graph and a pie chart
4. Represent data using
 - b. table, a bar graph a pictogram graph, a broken line graph

My country is Winter – The vocabulary

Cycle 3 of elementary

The vocabulary from the *Progression of Learning*

Air	Metabolism
Bird	Need
Camouflage	Observe
Comfortable, comfort	Season
Cold	Shape
Colour	Skin
Energy	Temperature
Heat	Texture
Hot	Thermal
Insulator, insulation, to insulate	Thermometer
Magnifying glass	Time
Mammal	Timer, to time
Measure	

The vocabulary associated to the General Learning Process in science and technology

Confirm, refute (the hypothesis)
Experiment, to experiment
Experimental factor(s)
Hypothesis
Protocol
Sample

Complementary vocabulary

While this vocabulary is not the subject of formal evaluation, it is recommended that the student have a look at it in order to begin using the words.

Leather
Fat, blubber
Coat, Fur
Plumage,
Feathers
Hair

Complementary references

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General learning process in science and technology in elementary school
http://www2.cslaval.qc.ca/cdp/pages/primaire-outils-ressources_engl.html

Vignettes (illustrations)
http://www2.cslaval.qc.ca/cdp/UserFiles/File/downloads/clipart_science_technology/

The Canadian Encyclopedia

<http://www.thecanadianencyclopedia.com/index.cfm?PgNm=HomePage&Params=A1>

Nunavik Tourism - Wildlife

<http://www.nunavik-tourism.com/Wildlife.aspx>

Québec Ministry of Natural Resources Québec

<http://www.mrn.gouv.qc.ca/english/home.jsp>

Focus on Wildlife in Québec: <http://www.mddefp.gouv.qc.ca/faune/inter-en.htm>

La page Éducation sur la faune : <http://www.mrn.gouv.qc.ca/faune/education/index.jsp>

Notions fact sheets from the Allô Prof web site (available only in French)

<http://bv.alloprof.qc.ca/science-et-technologie/l'univers-vivant/la-diversite-de-la-vie/la-diversite-chez-les-vivants/les-adaptations-physiques-et-comportementales.aspx>

Thouin, Marcel, *Enseigner les sciences et la technologie au préscolaire et au primaire*, Éditions Multimondes, Sainte-Foy, 2004.

L'énergie : page 29
La chaleur : pages 31 et 32

Thouin, Marcel, *Notions de culture scientifique et technologique : concepts de base, percées historiques et conceptions fréquentes*, Éditions Multimondes, Sainte-Foy, 2001.

L'énergie : pages 40 à 42
La chaleur : pages 48 à 51

Éclairs de sciences - <http://www.eclairdesciences.qc.ca/>

Living Things – Cycle 1– Activity 5 – *What do animals do in winter?*: Scientific conceptual content,
page 4
http://www.eclairdesciences.qc.ca/en/living_things.html.

Description of the learning situation

Preparation phase	Pages in the student booklet
<ul style="list-style-type: none"> • Context related to everyday life <ul style="list-style-type: none"> ○ Reformulation of the problem • Initial ideas 	Page 1 Page 1 Page 2 (open)
Performance phase	
<ul style="list-style-type: none"> • Hypothesis • Planning (Materials) • Planning (Protocol) • Implementation (Results) • Report (Adjustments) 	Page 2 Page 3 Page 4 Page 5 Page 6 (open)
Integration phase	
<ul style="list-style-type: none"> • Report (Review of initial ideas and the hypothesis) • Report (Unforeseen events or problems encountered) • Report (Acquired knowledge) 	Page 6 Page 6 Pages 6 and 7
Learning activities* (to be carried out when deemed appropriate)	Optional
<ul style="list-style-type: none"> • The thermometer* • The timer* • New words 	

* For these learning activities, it is possible to use existing activities for example those found in the math material for learning measurement.

Animation guide

Important!

The next pages in this guide relate to the student booklet. There are suggestions for the animation of the learning situation.

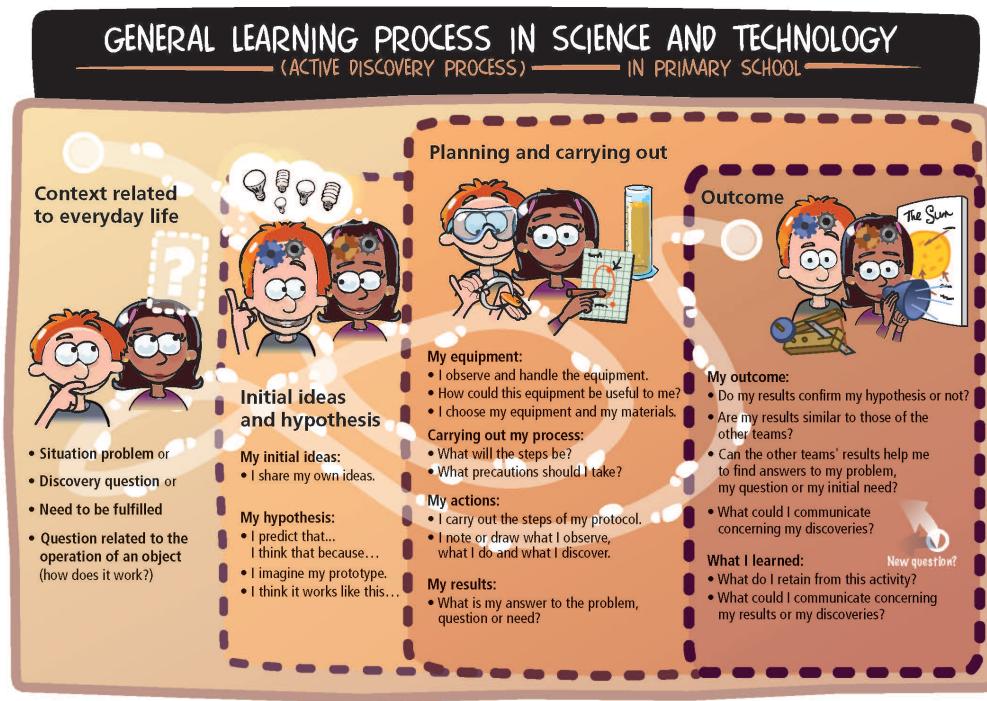
For the *My country is Winter* activity, there are two versions of the student booklet:

- A “directed” booklet
- An “open” booklet. The extracts from this booklet can be distinguished by the dotted frame.

To respond to the adapted pedagogical aim, the booklet may be adapted depending on the targeted class, the timing in the cycle and on the experience (or autonomy) of the students. The use of the open booklet is the ideal to be reached, but the teacher must organise their teaching plan so as to allow the student to achieve at least a certain degree of autonomy.

We have produced a single pedagogical guide to avoid duplicating documents. In order for the students to experience a learning situation in science and technology, in the next pages we propose suggestions for animation that the teacher can adapt to one or the other booklet.

The proposed animation may seem linear. Much as scientists and technologists do, however, it is possible and even recommended to allow the students to go back over certain elements in order to readjust them. The only elements we ask the students not to modify are their initial ideas and hypotheses.





Preparation phase
Context related to everyday life
Estimated time: 15 minutes (to be validated)

Name: _____

My country is Winter

What keeps an animal warm?
What I retain from the discussion

Observe the pictures that follow and formulate a hypothesis on the next page.

Human

Polar bear

Whale

Ptarmigan

Arctic fox

Musk ox

Seal

Weasel

Snowy owl

Beluga

Walrus

Black bear

The pictures of the black bear, common seal, and the snowy owl are used thanks to the cooperation of the Zoo sauvage de Saint Félicien

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country_winter_student_directed.docx

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Page 1

1. Read the question with the students and through a class discussion, ensure that they have understood.

The students' answers may be quite varied. Most students should have some previous knowledge about the subject. Certain answers formulated by the students may be related to behavioural adaptations, for example hibernation or migration. Other responses will be classified among physical adaptations, like moulting or storing fat, for instance. Other ideas may come up during the discussion.

It is important to underline to the students that there are no right or wrong answers.

2. Classify the ideas according to categories: physical or behavioural adaptations.

In response to this classification, it is important to tell the students that "*My country is Winter*" relates to physical adaptations of animals who winter here.

Preparation phase and beginning the performance phase

Initial ideas and hypothesis

Estimated time: variable, depending on the students' familiarity with the general learning process in science and technology

Observe the pictures that follow and formulate a hypothesis on the next page.

1. Give the students the instruction to formulate a hypothesis related to the images presented (page 1 of the booklet) and to the physical adaptations of these animals. The students should not only consider a single animal.

At this time, or a little before, it is essential to present the general learning process in science and technology to the students and to have them notice that the pictograms used in the booklet are directly related to the "high points" of the process. The students who issue a hypothesis for the first time may need help. A learning activity related to hypothesis formulation may need to be planned.

2. Ask the students to use a pen for formulating the hypothesis.

It is important to insist on the "I think that because" formulation. The students must formulate this explanation based on their impressions, the previous knowledge and their observations. There is no right or wrong answer. It is possible that the student realises that his hypothesis is refuted during the experiment. He may then be tempted to change it, thinking that his answer was "wrong". This is why we recommend they use a pen. When the report is produced, the student will have the opportunity to go over his hypothesis and explain his new understanding of the problem.

In fact, when the student formulates his hypothesis, it is interesting if the hypothesis is wrong. That way, the student will have the opportunity for real learning.

<p>My hypothesis:</p> <p>I think that _____ keeps the animal warmer because _____</p> <p>_____</p> <p>_____</p>	<p>My hypothesis:</p> <p>I think that _____ keeps the animal warmer the leather, the skin, the fur, the feathers, the down, the fat because _____</p> <p>_____</p> <p>_____</p>
<p>Cr1 Appropriate description of the problem</p>	<p>Formulation of a tentative explanation</p>

3. Some misconceptions

We recommend that the teacher review his understanding of heat, temperature and cold. Without having to explain these concepts in detail, it will be thereby easier for him to adequately support the students' learning. Some accessible resources are cited at the end of this guide.

Here are some misconceptions that the students may name.

Concerning the concept of heat (Thouin, 2003, pages 50 and 51)

- Heat is a substance that moves.
- All solids conduct heat the same way.
- Heat and temperature are synonyms.

Concerning the concept of cold

- Just as we may add heat to make the temperature of a substance increase, many believe that we can add cold to make the temperature decrease.

Concerning the colour of an animal

- Dark coats and plumage are warmer than light ones.

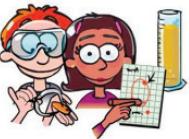
About heat and cold

We frequently hear that to cool a substance, we need only add cold to it. This concept is incorrect. The elementary school teacher can avoid feeding this notion simply by adjusting his discourse when he speaks of heat and cold, even in an everyday language.

Cold, in fact, is simply the absence of heat. We can withdraw or add heat, but not cold!

For the curious among you, reading this web page is recommended (in French):

http://labmecas.uqam.ca/demythifications/presentDemyth3.php?id_demyth=64. It demystifies the existence of cold.



Performance phase
Planning and implementation
Estimated time: 60 minutes (to be validated)



Experiment to test your hypothesis.
Objective: Test the efficiency of various substances to conserve heat.
Planning and carrying out

Materials at your disposal:

- Down
- Leather
- Fat
- Fur
- Thermometer
- Timer
- Ice

1. Form teams of two (2) students.

We suggest you form pairs. Each student should, however, complete his booklet individually. The “planning and implementation” dimension of the process may take place as a workshop. If so, take care to provide a corner of the classroom where the students can work with the materials.

2. Present all the materials to the students¹

Whether the “directed” or “open” booklet is used, we suggest you present all the materials to the students.

3. Important!

It is important to specify to the students that it is forbidden to open the bags containing the samples. It is possible that some bags get holes in them through use. The students should be encouraged to handle them carefully to avoid messes. A few spare bags should be provided.

3. Planning and carrying out the manipulations

Fill in the experimental factors table.

This table is provided in the directed booklet to make the student think about the necessity of making a single experimental factor vary at a time. The teacher may complete it with less experienced students. This part of the process should be carried out before planning, but we did notice, during our experiments that it is preferable, with novice students, to go back over it after the protocol is written.

To test the efficiency of various substances, which experimental factors should remain identical during the experiment? Which should vary?

Tick what should remain identical and what should vary.

+	Experimental factors	Remain identical	Vary
	Initial temperature of the ice		
	Time in the ice		
	Substance tested		

¹ All the details concerning materials are in the *Suggestions for materials* section at the end of this guide.

- In the “**directed**” booklet, the experimental process is suggested to the student. The “planning the process” element can therefore not be used to give feedback.

Note: In any experiment, a single experimental factor must be tested at one time. For this experiment, only the tested substance should vary. The time of exposure to cold and the technique used should remain identical.

Protocol

- Note the initial temperature. 
- Insert the thermometer between two samples of the first substance to be tested.
- Place this assembly, samples and thermometer, in the ice and start the timer at the same time.
- Wait _____ minutes. 
- Note the results.
- Repeat steps 1 to 5 for the 3 other substances.

Important!

Wait for the thermometer to return to room temperature between each trial.

Based on the materials supplied, plan your experiment.

- In the “**open**” booklet, the student must plan his process using the materials put at his disposal.

To consign the traces of his plan, the student is not obliged to write something. He may choose to use a sketch, a text or a diagram. It is suggested that he validate his process before starting the manipulations in order to avoid accidents or dangerous situations as well as broken equipment. The validation may be carried out orally for the students who need to experiment before going on to the planning stage.

4. Some recommendations

Regarding the protocol: a 2 minute waiting time is enough to get noteworthy results. Beyond this time, all the samples will reach too similar a temperature.

Suggestion: You may want to ask the students to use a coloured pencil for the initial planning. During the course of the experiment, adjustments are often necessary: different colour pencils may then be used to annotate the initial plan.

6. Consign the data collected.

In the “**directed**” booklet, a data consignment table is provided. You must ensure that the students have understood the protocol presented.

Results

Collect your data using the following table

Variation in temperature observed for various substances

Substances	Initial temperature of the substance (°C)	Final temperature of the substance (°C)	Difference in temperature (°C)
Leather or suede (skin)			
Fat (vegetal fat)			
Fur			
Down			

Represent your data using a bar graph

Variation in temperature observed for various substances



Results

Collect and organise your experimental data

Cr2 Application of an appropriate procedure Implementation of procedure

a) Represent your data

Cr2 Application of an appropriate procedure Implementation of procedure

In the “**open**” booklet, the student is responsible for presenting the data collected concisely. The same goes for data treatment. The bar graph is used in the “directed” booklet while in the “open” booklet, the student is responsible for highlighting, by the means he chooses, the trend observed in his data.

Examples of results for an exposure time to cold of 2 minutes

These values are given as examples only. You must not expect to obtain the same results.

Title: *Temperature difference for various substances*

Substance	Initial temperature (°C)	Final temperature (°C)	Difference in temperature (°C)
Leather or suede (skin)	21	3	18
Fat (lard)	22	17	5
Fur	20	9	11
Down	21	11	10

To complete the analysis of the results

b) For which substance did you see the greatest difference in temperature?

c) For an animal outside in winter, what does a large temperature difference indicate?

 Cr4 Appropriate use of scientific and technological knowledge Production of explanations or solutions 

Two questions are presented to the students in order to guide their thought process about the observed results. These questions lead the students to produce an explanation related to the process. It is important here to make the students notice that it is not the substance that presents the greatest difference in temperature that is the best insulator. In fact, a greater temperature difference indicates that this substance insulates more poorly than the others.



Performance phase (end) and integration phase

Report

Estimated time: 30 minutes or more if you want all the students to have the opportunity to express themselves.



Outcome

- a) Does your experiment confirm what you thought (initial ideas and hypothesis)? Explain your answer.

Note to the teacher: It is important to mention to the students, especially the ones with little experience, to go back over the hypothesis and the discussion elements noted on pages 1 and 2 of the booklet to explain that the answer is critical. It is essential to have a full answer, not simply a "Yes or No" response.

Important!



Regardless of the model of the student booklet you choose, it is of utmost importance that the conclusion, accomplishments and explanations the students

provide reflect the data they collect. It may be that something unforeseen occurred during the experiment. The student can attempt to explain it by comparing his results to those of his peers. It will therefore be important to plan a time for sharing with the students to ensure that everyone identifies fat as the best protection against cold and that they can conclude that it is therefore an excellent insulator.

The most common problems:

- The bulb of the thermometer is not protected by the sample (e.g. directly in contact with the ice);
- The initial temperature of the thermometer has not returned to room temperature;
- The exposure time to the ice is too long and all the substances end up attaining the same temperature;
- The tested substance is poorly distributed in the bag;
- The fur and down samples are too compressed (or there is not enough air or the bag has a hole in it);
- There was an error reading the thermometer.

Note: It would be surprising if no unforeseen events occurred at some time or other in the process. The difficulty may have appeared when the hypothesis was formulated, during planning or in the research for strategies to communicate the results. It may be necessary to supply an explanation or to help the students to complete this section.

- b) Explain an unforeseen event or difficulty that occurred during the experiment. Write what you did.

[+]

- c) If you could start over, explain what you would do differently.

Cr4 Appropriate use of scientific and technological knowledge	Production of explanations or solutions	
Cr2 Application of an appropriate procedure	Readjusting the process, as required	

Demonstration suggested for integrating learning:

1. Fill a dish pan with cold water and ice.
2. Ask student volunteers to coat their hand with a fat substance (butter, lard, shortening or petroleum jelly). It is important to keep the other hand intact.
3. Ask the student volunteers to simultaneously plunge both hands into the ice water.
4. Ask the student volunteers to describe the sensation.

Explanation: The students will feel the cold much less on the hand coated with the fatty substance. Since the hand is protected by a good thermal insulator (the fat), the body heat in that hand is better conserved. This fact is exploited by open water swimmers who coat their body before a race. This allows them to conserve their body heat and to reduce the risk of hypothermia.

Reinvestment of learning (optional)

Activity 5 – Short research project

Choose one of the animals shown. Explain what allows it to retain its body heat. Cite the information sources consulted.

*The pictures of the black bear, common seal, and the snowy owl are used thanks to the cooperation of the Zoo sauvage de Saint-Félicien.

Proficiency of subject-specific knowledge targeted in the Progression of Learning	Describe the activities related to living beings' metabolism (energy transformation, growth, system maintenance, retaining body heat)	
	Adequately use the terminology associated to the living world	

1. Assign each student one of the animals shown.

The student will have to research information by consulting a minimum of two different sources of information and citing the sources. He will have to write a short text presenting the animal's strategies for protecting itself against the cold. The results of the research may also be presented in the form of a slide show, a poster or any other communication tool other than a written document.

The student may distinguish physical adaptations from behavioural adaptations.

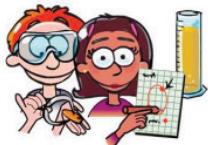
The students must be told the due date for handing in the work.

2. Ask the students to fill in the vocabulary sheet

Outcome What I learned	
	
Definitions	
Hypothesis: _____ _____	
Variation in temperature: _____ _____	
Experimental factor: _____ _____	
Protocol: _____ _____	
Thermometer: _____ _____	

The suggested table makes it easier to build a vocabulary of words used in science and technology, related to the *Progression of Learning* or to the process.

The student who chooses to show a concept or a word by a picture or a drawing can use the second column of the table. This strategy may prove to be useful for students who find the written or spoken language particularly challenging.



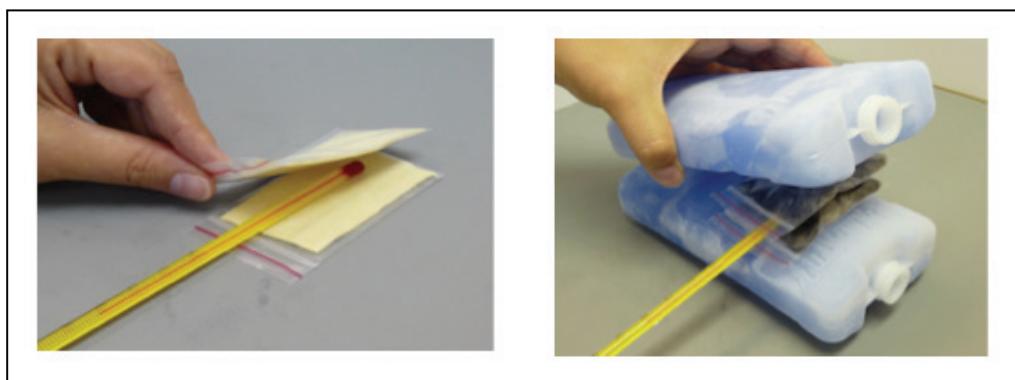
Suggestions for materials

Materials to be put at the disposal of the students for a class of 28 students

Items	Notes
14 pairs of very cold objects	<ul style="list-style-type: none">The task was tested using lunch box sized ice packs.You may also use gel packs, ice in a zipper-type bag or compressed snow.
14 pairs of down samples	<ul style="list-style-type: none">The down may come from a cushion or pillow.
14 pairs of suede or leather samples	<ul style="list-style-type: none">The sample of suede or leather is used to simulate bare skin (without protection). This leather or suede may come from a shammy intended to wash cars.
14 pairs of fat samples	<ul style="list-style-type: none">For the fat, use vegetal fat (shortening), lard or margarine.Note that lard is a better insulator than shortening.
14 pairs of hair samples	<ul style="list-style-type: none">It is possible to obtain hair from an animal grooming salon.
14 thermometers	<ul style="list-style-type: none">The thermometer will be used to measure the temperature difference between the samples when they are placed between the ice packs.They will need to allot enough time for the thermometers to come back to the temperature of the classroom before working with a second sample.
28 pairs of safety glasses	<ul style="list-style-type: none">Because it is possible for a thermometer to break, we recommend that the students wear safety glasses.This also gets the students used to wearing the glasses.
14 timers	<ul style="list-style-type: none">The timer is used to monitor the exposure time of the samples.It may be activated by the teacher if you opt for a synchronised experiment.You may use the digital version on a smart board, from the computer, from the touch pad or on a watch.
Sealed zipper type bags (5 cm x 8 cm)	<ul style="list-style-type: none">These Ziplock type bags are used for the samples of down, leather, fat and hair.These bags should be prepared ahead of time, particularly in classes where students are allergic to down or animal hair.These bags allow the samples to be kept for later use.

Additional remarks:

- We recommend that you supply several types of samples to be tested. These samples should simulate what is generally found in animals: hair, fat, leather, down.
- It is important that the sample bags remain sealed. The samples of down and hair must contain air to properly simulate the plumage or pelt on an animal. You will need to mention this to the students. In fact, their respective insulation capacity resides in the layer of air stored. Tests carried out when the down or hair samples are compressed confer upon them about the same results as the protection provided by bare skin without protection.
- Allergies:** If a student is severely allergic, it is possible to replace the hair by synthetic fur. As for the down, it could be replaced by synthetic padding.
- Using the thermometer:** In order to obtain a proper temperature reading, it is recommended you operate with two sample bags and to place them between two ice packs, as shown below.

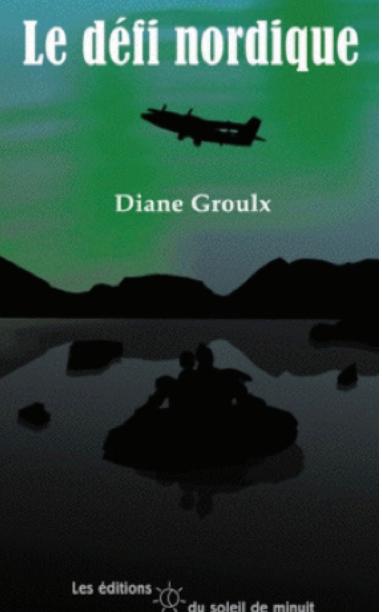


- **About safety glasses:** Though this task represents a low risk for accidents, we recommend that the students wear safety glasses when they manipulate the thermometer. This will avoid any negative consequences should a thermometer break.
- **Suggestion for organising the materials:** The sample bags, the timer and the safety glasses can be placed in a transparent box. To protect the glasses, we recommend they be covered with a sock.



Suggestion in youth literature

Before proposing the task to the students, or after having carried out all the activities in class, it is possible to enter the world of a book, story, tale or novel related to the theme of heat, thermal comfort, or the physical adaptations of animals to protect themselves from the cold. Unfortunately, these themes are little shown in recent youth literature. We therefore recommend that teachers pay attention to new releases.

	<p>Le défi nordique</p> <p>Author: Diane Groulx Editor: Les éditions du soleil de minuit, 2009 ISBN: 978-2-9226-9177-1, 9,95\$</p> <p>In this story, Julian moves to Nunavik, and discovers Inuit culture and language.</p> <p>This book could be used as a context trigger and serve as a transition before asking the students the initial LES question (What keeps an animal warm?)</p>
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Evaluation

The table below allows you to retrace the evaluation elements that can be found in the student booklet.

Synthesis of traces for evaluation

Evaluation criteria	Elements promoting the understanding of the criteria	Page
Cr1 Appropriate description of the problem	Reformulation of the problem	Page 1, orally
	Formulation of a tentative explanation or solution	Page 2
Cr2 Application of an appropriate procedure	Planning of work	Directed booklet N/A Open booklet page 3
	Implementation of procedure	Page 4
	Readjusting the process, as required	Page 5 c)
Cr3 Appropriate use of instruments, tools or techniques	Handling of objects, tools or instruments	Page 3 (process)
	Observance of safety rules	Page 3 (process)
Cr4 Appropriate use of scientific and technological knowledge	Production of explanations or solutions	Page 5 b) Page 6 a)
	Use of terminology, rules and conventions specific to Science and Technology	Page 5 a)
Proficiency of subject-specific knowledge targeted in the <i>Progression of Learning</i> ²	Material World	Page 5 et 7
	Strategies ³	

² It is important to remember to include learning related to techniques and instrumentation (section E) and appropriate language (section F) for each world.

³ While feedback regarding this element must be provided to the student, it is not considered in the results communicated on the report card.