LEARNING GUIDE

TRANSFORMATIONS

THE ENERGY CHALLENGE

SCIENCE AND TECHNOLOGY

TSC–4061–2

IN COMPLIANCE WITH THE NEW PROGRAM

SOFAD

LEARNING GUIDE

TRANSFORMATIONS

THE ENERGY CHALLENGE

SCIENCE AND TECHNOLOGY

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Legend: l = Left c = Centre r = Right
t = Top b = Bottom

Table of Contents

This preview contains:
- The Table of Contents;
- The Introduction;
- The First Situation.

CHAPTER 1

Energy Transformation
My Energy Consumption

SITUATION 1.1

RELATIONSHIP BETWEEN POWER AND ELECTRICAL ENERGY
LAW OF CONSERVATION OF ENERGY
ENERGY TRANSFORMATION

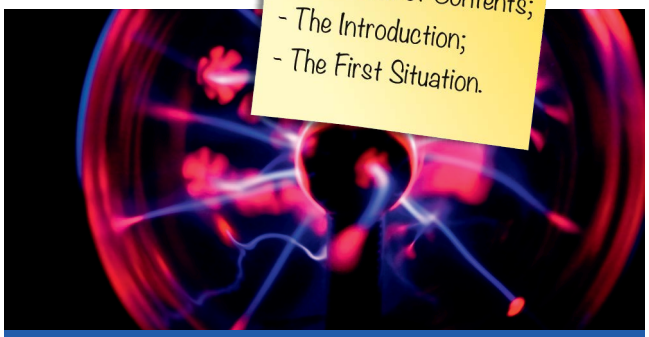
LS 1.1 – My Energy Budget 4
Exploration 5
Acquisition 7
Solution 20
Consolidation 24

SITUATION 1.2 PRACTICAL ACTIVITY

ENERGY EFFICIENCY
DISTINCTION BETWEEN HEAT AND TEMPERATURE

LS 1.2 – The Energy Efficiency of Two Home Appliances 26
Exploration 27
Acquisition 28
Solution 36
Consolidation 41

KNOWLEDGE SUMMARY 42
INTEGRATION 44
LES 46



CHAPTER 2

Electrostatics
Opposites Attract

SITUATION 2.1 PRACTICAL ACTIVITY

RUTHERFORD'S ATOMIC MODEL
SUBATOMIC PARTICLES
ELECTRIC CHARGE
STATIC ELECTRICITY
ELECTRIC FIELD
COULOMB'S LAW

LS 2.1 – An Electrifying Party 52
Exploration 53
Acquisition A 54
Solution 60
Acquisition B 64
Consolidation 67

SITUATION 2.2

THE PERIODIC TABLE
MINERALS

LS 2.2 – Mineral Resources in Québec 70
Exploration 71
Acquisition 73
Solution 82
Consolidation 85

KNOWLEDGE SUMMARY 86
INTEGRATION 89
LES 92

CHAPTER 3

Simple Electrical Circuits

A Question of Connections

SITUATION 3.1

POWER SUPPLY, CONDUCTION, INSULATION, PROTECTION AND CONTROL FUNCTIONS

ELECTRICAL CIRCUITS

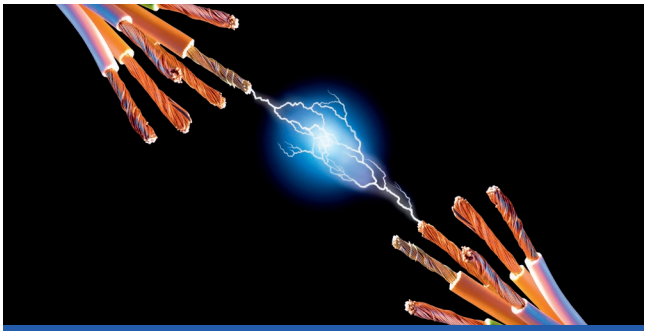
LS 3.1 – A Simple Flashlight 96
Exploration 97
Acquisition A 99
Solution 108
Acquisition B 110
Consolidation 112

SITUATION 3.2 PRACTICAL ACTIVITY

OHM'S LAW | ELECTRICAL CIRCUITS | RELATIONSHIP BETWEEN POWER AND ENERGY

LS 3.2 – Front Door Security 114
Exploration 115
Acquisition A 117
Solution 128
Acquisition B 132
Consolidation 134

KNOWLEDGE SUMMARY 137
INTEGRATION 140
LES 142



CHAPTER 4

Electrical Circuits and Appliances

Electricity Is Everywhere

SITUATION 4.1

SERIES AND PARALLEL CIRCUITS | KIRCHHOFF'S LAWS

LS 4.1 – Electronic Repairs 146
Exploration 147
Acquisition 149
Solution 158
Consolidation 160

SITUATION 4.2 PRACTICAL ACTIVITY

COMBINATION CIRCUITS

LS 4.2 – A Home Stair Lift 164
Exploration 165
Acquisition A 167
Solution 172
Acquisition B 176
Consolidation 179

KNOWLEDGE SUMMARY 182
INTEGRATION 184
LES 188

CHAPTER 5

Magnetism and Electromagnetism
Attraction, Repulsion and Electric Current

SITUATION 5.1 PRACTICAL ACTIVITY

FORCES OF ATTRACTION AND REPULSION
MAGNETIC FIELD SURROUNDING A CURRENT-CARRYING WIRE
MAGNETIC FIELD OF A SOLENOID

LS 5.1 – A Speaker Design 192
Exploration 193
Acquisition A 195
Solution 204
Acquisition B 206
Consolidation 208

SITUATION 5.2

ELECTROMAGNETIC INDUCTION

LS 5.2 – Electric Motors 210
Exploration 211
Acquisition 212
Solution 218
Consolidation 223

KNOWLEDGE SUMMARY 225
INTEGRATION 227
LES 228

CHAPTER 6

Energy Challenges
Production and Use of Energy

SITUATION 6.1

ENERGY RESOURCES IN THE LITHOSPHERE

LS 6.1 – The Earth's Energy 234
Exploration 235
Acquisition A 237
Solution 244
Acquisition B 249
Consolidation 253

SITUATION 6.2

ENERGY RESOURCES IN THE ATMOSPHERE AND THE HYDROSPHERE
SOLAR ENERGY
THE EARTH-MOON SYSTEM

LS 6.2 – Electricity Production 254
Exploration 255
Acquisition A 256
Solution 266
Acquisition B 272
Consolidation 275

KNOWLEDGE SUMMARY 277
INTEGRATION 279
LES 282

ADDITIONAL MATERIALS

SELF-EVALUATION 287
REVIEW 301
APPENDICES 303
GLOSSARY 305
ANSWER KEY 312
RUBRICS FOR THE COMPETENCIES 354

About this Learning Guide

Welcome to the learning guide for *The Energy Challenge* course. This **Secondary IV** course in the **Science and Technology** program is intended to develop your ability to deal with situations relating to:

- the transformation of energy and energy efficiency;
- the basic principles of electricity and electrostatics;
- the operation of series and parallel electrical circuits;
- magnetism and electromagnetism;
- energy challenges.

Listed below are the three competences you will develop:

- seeks answers or solutions to scientific or technological problems;
- makes the most of his/her knowledge of science and technology;
- communicates in the languages used in science and technology.

You are now invited to carry out the learning activities presented in the six chapters of this learning guide.

Portailsofad.com

Video capsules and printable versions of the of the complementary resources for this guide and the rest of the TRANSFORMATIONS collection are available at portailsofad.com; they will assist you throughout the course.

CHAPTER ORGANIZATION

The learning process presented in each chapter allows you to make progress by building on what you learned in the previous sections. The following diagram illustrates this process and states the educational aim of each section.

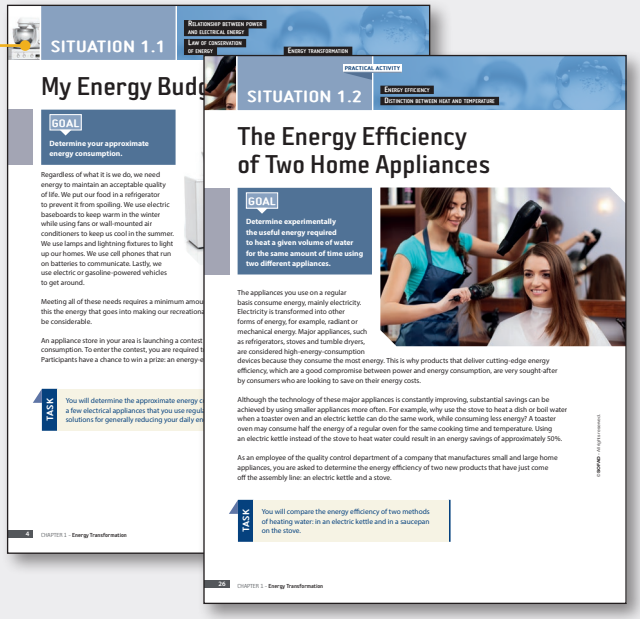
INTRODUCTION TO THE CHAPTER

The first page describes the context and the theme that will provide the basis for learning the new concepts introduced in the chapter.

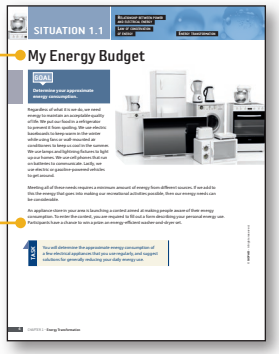
A table of contents opposite the first page presents the knowledge to be acquired in the two learning situations and the theme of each one.

SITUATIONS

There are two learning situations in each chapter: one is theoretical and the other is practical, in the form of an experiment. The learning process in both situations allows you to acquire new concepts and develop competencies within real-life, meaningful contexts.



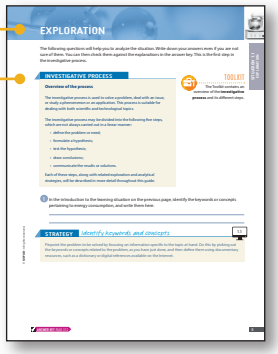
PARTS OF A LEARNING SITUATION



PRESENTATION OF THE LEARNING SITUATION

This page sets out the main theme of the chapter, briefly describes the context of the learning situation, and provides the information needed to complete the task.

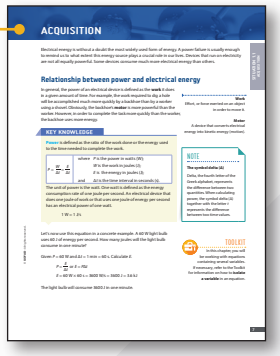
A text box describes the task to be carried out later on, in the *Solution* section. This task is the starting point for acquiring the new knowledge that will enable you to complete it.



EXPLORATION

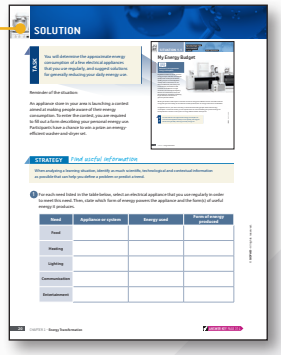
In this section you will analyze the information provided in the learning situation and identify what you already know about the topic at hand, as well as the new knowledge you will need to complete the task.

Different aspects of the investigative process in science and exploration strategies are suggested here.



ACQUISITION

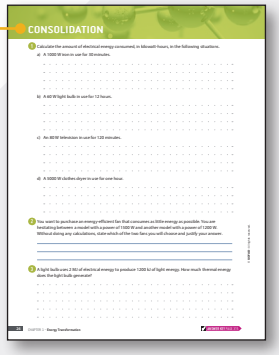
In this section, you will acquire the knowledge required to complete the task.



SOLUTION

When you get to this section, you should have all the knowledge you need to complete the task described at the beginning of the chapter.

Additional elements of the investigative process in science and exploration strategies are suggested here.



CONSOLIDATION

This section allows you to put into practice the knowledge covered in *Acquisition A* and *Acquisition B*. Like the Integration exercises, the Consolidation exercises also help you to develop the competencies.

AT THE END OF THE CHAPTER

KNOWLEDGE SUMMARY

This section summarizes all the key concepts presented in the chapter.

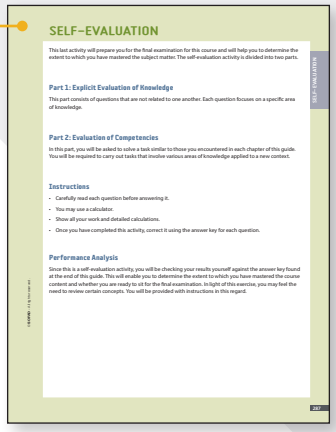
INTEGRATION

This section includes complex exercises and scenarios that require you to apply what you have learned in the chapter.

LES

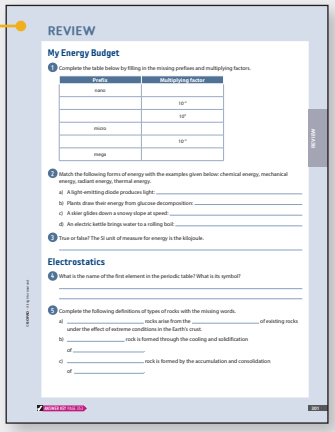
The learning and evaluation situation *(LES)* is a complex task similar to those that you will encounter in the final exam. It includes a rubric for the comptencies (competency evaluation chart).

ADDITIONAL MATERIALS



SELF-EVALUATION

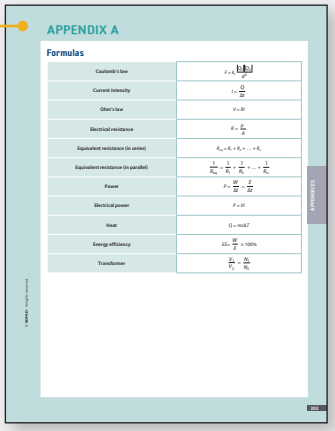
A *Self-Evaluation* activity is found at the beginning of the *Additional Materials* section. This activity allows you to assess what you have learned and the competencies you have developed during the course. It also helps you to determine what subject matter you have mastered and what concepts you must review before completing the *Scored Synthesis Activity*.



REVIEW

In the *Situation* sections, you will come across *Reminder* text boxes containing topics covered in previous courses, which are essential for understanding new concepts or completing the assigned task.

The questions and exercises in the *Review* section will help you review the topics appearing in the *Reminder* text boxes.

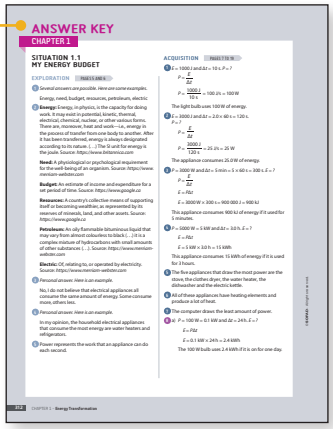


APPENDICES

This section presents additional information such as abbreviations and units of measure.

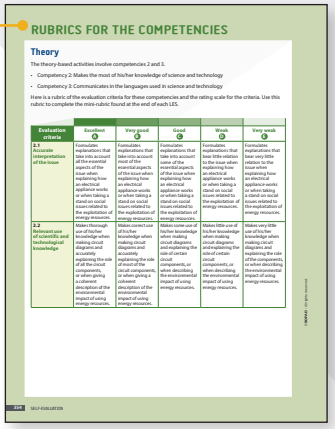
GLOSSARY

Key concepts **bolded blue** and terms **bolded black** in the body text of the chapters also appear in the *Glossary*.



ANSWER KEY

The *Answer Key* at the end of the guide will allow you to check your answers and will steer you through the learning process. It contains the answers to the questions in the guide and detailed explanations regarding the correct procedure or line of reasoning.



RUBRICS FOR THE COMPETENCIES

After completing a learning and evaluation situation, or *LES*, you can use the *Rubrics for the Competencies* at the end of the guide to evaluate your work. You can then complete the abbreviated rubric found at the end of each *LES*.

HEADINGS

TASK

You will explain which of the two approaches …

Presents the task to be carried out as part of the learning situation.

REMINDER

Thermal energy is due to the motion of particles that make up an object. Its unit of measure is the joule (J).

Refers to knowledge acquired in previous courses and to review exercises related to this *Reminder*.

KEY KNOWLEDGE

An **electrical circuit** is a set of components connected to a source of current by conductors.

Presents new key concepts to be learned. This knowledge is prescribed by the program of studies.

INVESTIGATIVE PROCESS *B...*

The first step in the investigative process is to define the problem …

Presents aspects of the investigative process in science that can be applied in various situations.

STRATEGY *Consider ...*

When an investigative process involves forming an opinion or …

Presents exploratory or analytical strategies that can be applied in various situations.

DID YOU KNOW?

"Seeing" a magnetic field

Place a bar magnet on a table and cover …

Encourages you to discover additional scientific, historical and cultural information related to the concepts being studied.

NOTE

A light-emitting diode is an electronic component in which the current …

Provides additional information or points out possible exceptions to the concept in question.

TOOLKIT

See the multimeter user guide …

Refers to information found in the **Toolkit**.

PRACTICAL ACTIVITY BOOKLET

You may now design your stair lift prototype in the …

Prompts you to complete a section in the practical activity booklet.

These symbols refer to Web resources (links or videoclips) available at portailsofad.com.

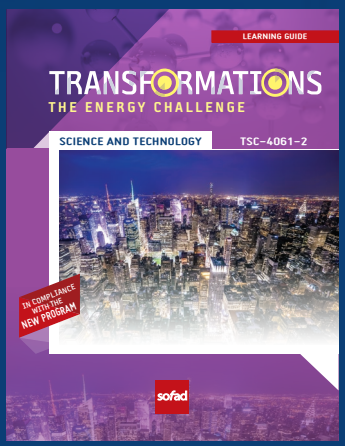
SCORED ACTIVITY

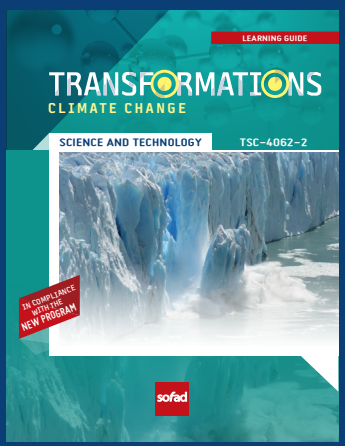
You must now do Scored Activity 1. It is available on the course website …

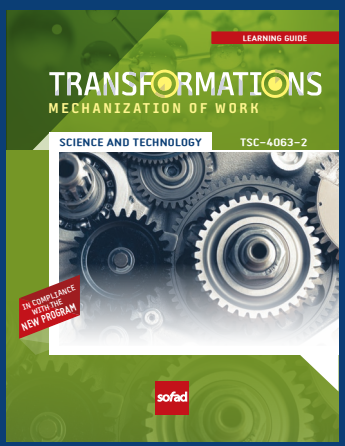
Indicates that you are now ready for the scored activity, which will test your understanding of the material covered so far. At the very end of the course you will complete a synthesis activity, which deals with all the material in the course.

These activities are presented in separate booklets. Once completed, they must be submitted to your teacher (or tutor), who will mark them and provide feedback.

The **TRANSFORMATIONS** collection consists of all the courses in the Diversified Basic Education Program for Secondary IV and Secondary V.







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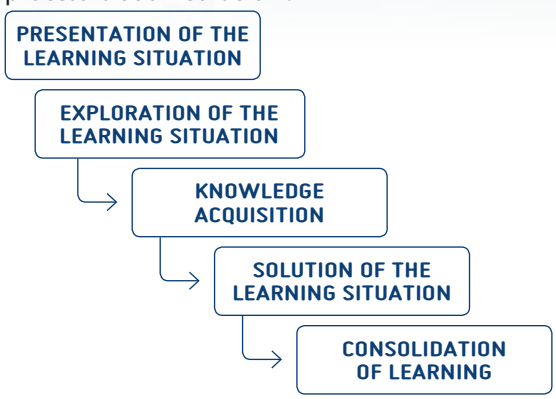
The courses in the **TRANSFORMATIONS** collection feature a learning process based on the acquisition of prescribed knowledge through interesting and meaningful learning situations. The instructional approach underlying this learning process is outlined below:



The knowledge and competencies to be developed become meaningful through investigations that require learners to use inductive and deductive reasoning skills. The learning guides provide a variety of simple exercises and more complex tasks that address the needs of both learners and teachers. Additional resources are available on Sofad's e-learning portal.

Components of the TRANSFORMATIONS collection:

- Experimental (or Practical) Activity Booklet (Print and PDF versions)
- Toolkit (PDF versions)
- Learning Guide (Print and PDF versions)
- Teaching Guide (PDF version)
- Video clips of concepts and laboratory techniques
- Kits of materials for the experimental and practical activities
- Scored activities
- Answer keys

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