

LEARNING GUIDE

TRANSFORMATIONS

GENERAL SCIENCE 2

SCIENCE AND TECHNOLOGY

TSG-4060-2



IN COMPLIANCE
WITH THE
NEW PROGRAM

SOFAD

LEARNING GUIDE

TRANSFORMATIONS

GENERAL SCIENCE 2

SCIENCE AND TECHNOLOGY

TSG-4060-2



SOFAD

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Legend: r = right c = centre l = left
t = top b = bottom

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About This Learning Guide

Welcome to the learning guide for the General Science 2 (TSG-4060-2) course. This Secondary IV science course is intended to develop your ability to deal with issues and problems that involve materials, engineering and the musculoskeletal system. This course will allow you to:

- analyze a technological application involving electrical or mechanical engineering;
- justify the decision to use pure substances or different types of mixtures in the composition of the materials used to make a technical object;
- use mechanical engineering to model the functioning of the musculoskeletal system;
- analyze characteristics of the musculoskeletal system;
- produce a graphical representation of the simple parts of a technical object;
- design a technical object using graphical language;
- plan, with assistance, the steps for producing a working prototype comprising mechanical or electrical components;
- follow, with assistance, a manufacturing process sheet for a prototype comprising mechanical or electrical components; and
- write a report on the testing of a prototype by following a basic framework.

You will develop the following three competencies:

- Seeks answers or solutions to scientific or technological problems
- Makes the most of his/her knowledge in 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 five chapters of this learning guide.

Portailsofad.com

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

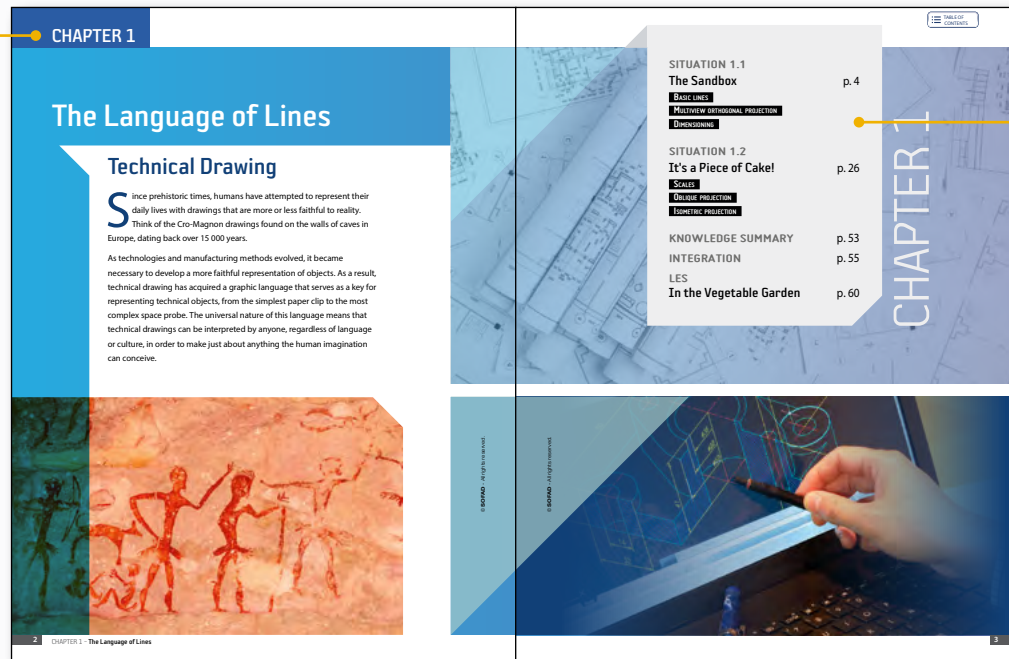


CHAPTER ORGANIZATION

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

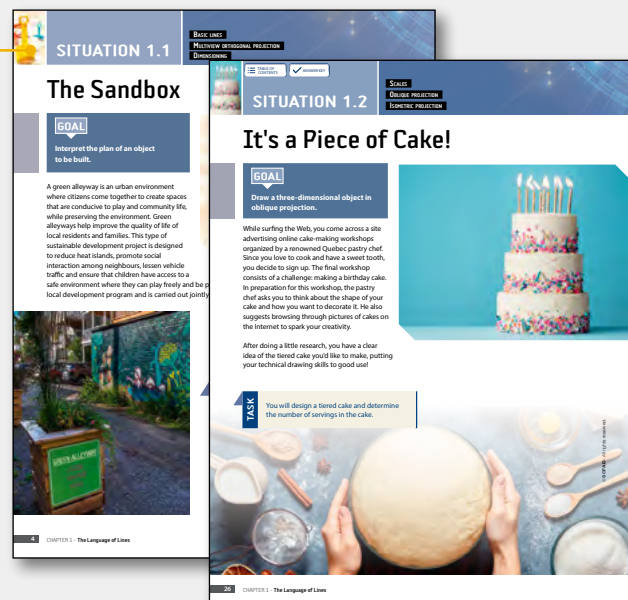
The first page describes the context and the theme that will provide the basis for learning the new concepts introduced in the chapter.



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. The learning process in each allows you to acquire new concepts and develop competencies within real-life, meaningful contexts.



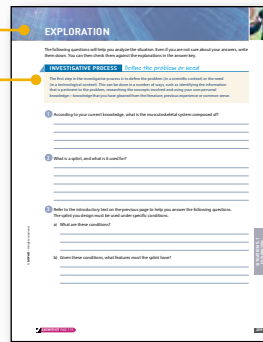
PARTS OF A LEARNING SITUATION



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.

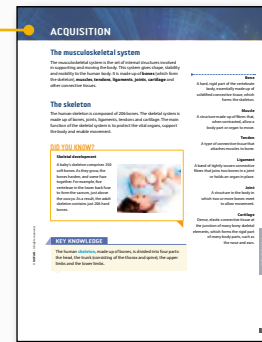
A text box describes the task to be carried out later on, in the *Solution* section. This task is the starting point for acquiring the new knowledge that will enable you to complete the learning situation.



EXPLORATION

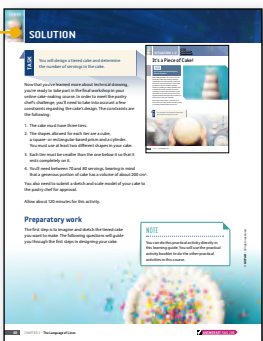
In this section, you will analyze the information provided in the learning situation and identify what you already know about the topic at hand, as well as the new knowledge you will need to complete the task.

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



ACQUISITION

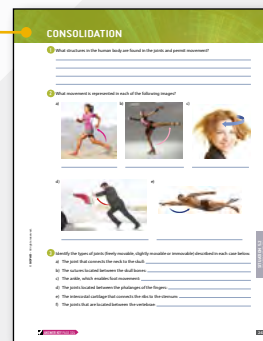
In this section, you will acquire the knowledge required to complete the task.



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 learning situation.

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



CONSOLIDATION

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

AT THE END OF EACH CHAPTER...

KNOWLEDGE SUMMARY

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

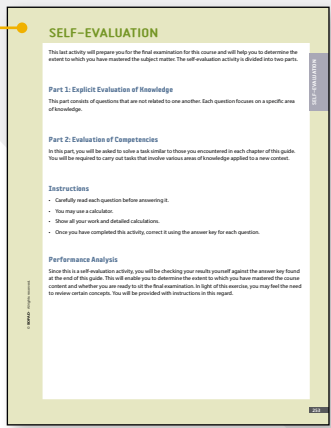
INTEGRATION

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

LES

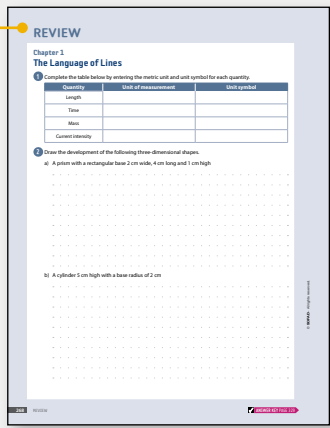
The *Learning and Evaluation Situation (LES)* is a complex task similar to those that you will encounter in the final exam. A rubric for the competencies (i.e. the Competency Evaluation Chart) is available on portailsofad.com.

ADDITIONAL MATERIALS



SELF-EVALUATION

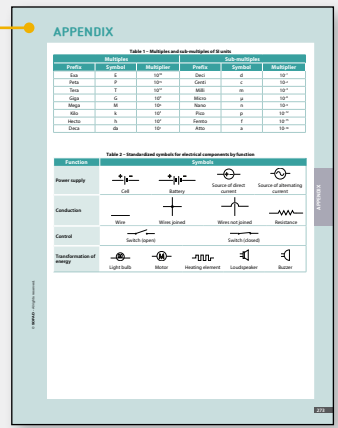
A *Self-Evaluation* activity is found in the first part of the *Additional Materials* section. It is used to evaluate the knowledge you have acquired and the competencies you have developed during the course. It also helps you determine the knowledge you have mastered and the concepts you must review before doing the *Scored Synthesis Activity*.



REVIEW

While working through the *Situation* sections, you will come across *Reminder* text boxes containing knowledge that you covered in previous courses and that you will need to understand new concepts or complete the task.

This *Review* section consists of questions that will help you to review the concepts appearing in the *Reminder* boxes.



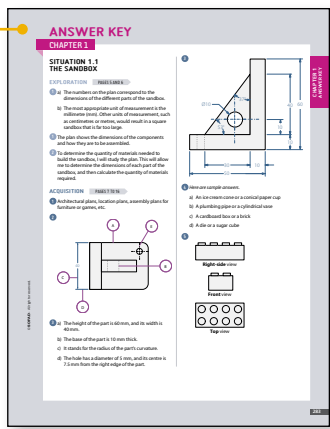
APPENDIX

In this section, you will find additional information.



GLOSSARY

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



ANSWER KEY

The *Answer Key* at the end of the guide will allow you to check your answers and 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 to be used.

HEADINGS

TASK

You will design a prototype of a weight machine that uses resistance bands to provide the tension force.

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

REMINDER

The periodic table of the elements

The table was first conceived in 1869 by the Russian chemist Dmitri Mendeleev ...

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

KEY KNOWLEDGE

A **raw material** is a naturally occurring material that must be transformed before it can be ...

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

INVESTIGATIVE PROCESS

The first stage in any technological design process is to identify a need that will be met by a technical object ...

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

STRATEGY *Break down a complex problem*

When a problem involves several constraints or parts, it is better to break it down into simpler subproblems. The solutions to the subproblems are then combined to give a solution to the original problem ...

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

DID YOU KNOW?

Plastics

Plastics are composed of polymers used in almost all activity sectors ...

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

SAFETY FIRST!

If you carry out the experiment using headphones rather than speakers ...

Provides safety tips related to practical activities.

NOTE

The experiment you have carried out is by no means a reliable hearing test since the result ...

Provides guidance, additional information or exceptions that may apply to the concept in question.



TOOLKIT

Instructions for preparing a table ...

Refers to the information found in the Toolkit, which is available on portaisofad.com.



LABORATORY REPORT

In the Practical Activity Booklet, in the

Refers to information to be completed in the Practical Activity Booklet.



Refers to web resources (sites or videos) available on portaisofad.com.

SCORED ACTIVITY

You will now complete Scored Activity 1. It is available on the course website ...

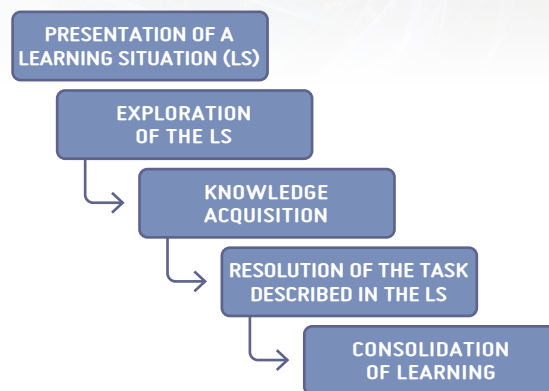
Indicates that you are now ready to do the *Scored Activity* that will test your understanding of what you have learned. The *Scored Synthesis Activity* is done at the very end of the course.

These activities are presented in separate booklets. Once you have completed them, you must submit them to your teacher or tutor, who will correct them and provide feedback.

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



The courses in the **TRANSFORMATIONS** collection feature a learning process based on the acquisition of prescribed knowledge through interesting and meaningful 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);
- Learning Guide: Print and PDF versions;
- Teaching Guide (PDF);
- Video clips of concepts and techniques;
- Materials used in experiments or practical activities;
- Scored Activities;
- Answer Keys.

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