DEFINITION OF THE EVALUATION DOMAIN

Adult General Education

Diversified Basic Education Program

Science and Technology

GENERAL SCIENCE 1 TSG-4059-2

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Québec

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Introduction

The Definition of the Evaluation Domain (DED) ensures consistency between a course and the related evaluation instruments. The DED is used to select, organize and describe the essential and representative elements of the course. The DED is based on the program of study and the course, but should by no means replace them in the planning of instructional activities.

All the DEDs produced after June 30, 2014, by the Ministère de l'Éducation (MEQ) are prescriptive. Consequently, they are the reference documents to be used in the development of all examinations, be they ministerial examinations or those developed by adult education centres or by Société GRICS (BIM). The DEDs thus serve as a model for preparing multiple equivalent versions of examinations that are valid across the province.[1]

Authorized educational institutions are responsible for the development of evaluation instruments for this course. The prototype examination provided by the Ministère may be used as is, be modified or be used as an example for the development of new versions.

Any new version of the examination or modifications of the prototype examination must bear the logo of the institution that developed it.

At no time may the ministerial and prototype examinations produced by the Ministère be used as evaluations to support learning or as classroom practice exercises.

Furthermore, as set out in the *Policy on the Evaluation of Learning*, adult learners must know what they will be evaluated on and what is expected of them.[2] The DEDs and the criterion-referenced rubrics are recommended for this purpose.

1. Québec, Ministère de l'Éducation du Québec, *Policy on the Evaluation of Learning* (Québec: Gouvernement du Québec, 2003), 47.
2. Ibid., 9.

Evaluation Content

General Information

Broad Areas of Learning

- Health and Well-Being
- Environmental Awareness and Consumer Rights and Responsibilities
- Career Planning and Entrepreneurship
- Media Literacy
- Citizenship and Community Life

Subject Area

- Mathematics, Science and Technology

Families of Learning Situations

- Research
- Expertise

Program of Study

- Science and Technology

Course

- General Science 1

Essential Elements Targeted by the Evaluation

Subject-Specific Competencies

1. Seeks answers or solutions to scientific or technological problems
2. Makes the most of [their] knowledge of science and technology
3. Communicates in the languages used in science and technology

Categories of Knowledge

General Concepts:

- Digestive system
- Nervous system
- Properties of matter
- Changes in matter
- Waves

Techniques:

- Experimentation
- Measurement

Evaluation Criteria

Evaluation Criteria for Competencies 1 and 3

1.1 Appropriate representation of the situation
1.2 Development of a suitable plan of action
1.3 Appropriate implementation of the plan of action
1.4 Development of relevant explanations, solutions or conclusions

Evaluation Criteria for Competencies 2 and 3

2.1 Appropriate interpretation of the issue
2.2 Relevant use of scientific and technological knowledge
2.3 Appropriate formulation of explanations or solutions

Proficiency in Subject-Specific Knowledge

Proficiency in subject-specific knowledge presupposes its acquisition, understanding, application and mobilization, and is therefore linked with the evaluation criteria for the competencies.

Explanation of the Evaluation Content

Evaluation Criteria

The evaluation criteria are stated exactly as in the course.

Competency 3 is integrated into the first two competencies and its evaluation criteria are based on those of these competencies.

Information Clarifying the Evaluation Criteria for Competencies 1 and 3 (Practical Part)

1.1 Appropriate representation of the situation

This criterion evaluates the adult learner's ability to:

- reformulate the goal of the experiment by representing the problem in context
- identify the scientific principles and techniques related to the problem to be solved
- formulate a hypothesis related to the context.

1.2 Development of a suitable plan of action

This criterion evaluates the adult learner's ability to:

- select the resources (e.g. materials, equipment, tools, quantities) that enable them to come up with an answer to the problem
- develop a plan of action that enables them to come up with an answer to the problem
- develop a plan of action autonomously and modify it during the experimentation or design process, if necessary.

1.3 Appropriate implementation of the plan of action

This criterion evaluates the adult learner's ability to:

- carry out the required experimentation techniques
- carry out the required measurement techniques
- work safely
- gather the data and use the appropriate types of representation.

1.4 Development of relevant explanations, solutions or conclusions

This criterion evaluates the adult learner's ability to:

- analyze the results obtained during the implementation of the plan of action
- provide a solution or a conclusion that is related to the goal or hypothesis
- provide clear answers that comply with scientific and technological terminology, standards and conventions.

Information Clarifying the Evaluation Criteria for Competencies 2 and 3 (Theory Part)

2.1 Appropriate interpretation of the issue

This criterion evaluates the adult learner's ability to make connections between the relevant information in the situation and the scientific and technological concepts needed to deal with the situation.

2.2 Relevant use of scientific and technological knowledge

This criterion evaluates the adult learner's ability to:

- explain issues and/or technological applications associated with the general concepts of the course
- justify opinions or choices related to issues and/or technological applications associated with the general concepts of the course
- represent, using different means (e.g. symbols, drawings, equations), the issues and/or technological applications associated with the general concepts of the course.

2.3 Appropriate formulation of explanations or solutions

This criterion evaluates the adult learner's ability to provide clear and structured answers that comply with scientific and technological terminology, standards and conventions.

Proficiency in Subject-Specific Knowledge

Proficiency in subject-specific knowledge is assessed through the evaluation of the competencies, using tasks related to the evaluation criteria.

For this course, certain knowledge is explicitly evaluated.

Weighting[3]

The weighting of the parts will be distributed as follows:

- Practical Part (Evaluation of Competencies 1 and 3): 40%
- Theory Part (Evaluation of Competencies 2 and 3): 60%; that is, 40% for the evaluation of competencies and 20% for the explicit evaluation of knowledge

The weighting of the evaluation criteria is detailed in the criterion-referenced rubrics found in the appendix of this document as well as in the *Marking Guide* and the *Adult's Booklet*. Adult learners must be made aware of the evaluation criteria used to evaluate them and the corresponding weighting of each criterion.

3. The weighting of the competencies is determined in accordance with the *Framework for the Evaluation of Learning* in general education in the youth sector.

Knowledge

Knowledge includes concepts and techniques.

Concepts

General Concepts	Compulsory Concepts
Digestive system	• Types of food: water, proteins, carbohydrates, fats, vitamins and minerals • Energy value of different foods • Transformation of food: mechanical, chemical • Digestive tract: mouth, esophagus, stomach, small intestine, large intestine, anus • Digestive glands: salivary glands, gastric glands, pancreas, liver, intestinal glands
Nervous system	• Central nervous system: brain, spinal cord • Peripheral nervous system: nerves • Sensory receptors: eye, ear, skin, tongue, nose
Properties of matter	• Characteristic physical properties: density, solubility • Characteristic chemical properties: reaction to indicators • Properties of solutions: concentration
Changes in matter	• Particle model • Physical changes: dissolution, dilution • Chemical changes: decomposition and synthesis, oxidation
Waves	• Frequency • Wavelength • Amplitude • dB (decibel) scale • Electromagnetic spectrum • Deviation of light waves • Focal point of a lens

Techniques

Note: The techniques from the program of study selected for evaluation are in the table below.

Categories of Techniques	Techniques
Experimentation	• Safely using materials and equipment • Using observational instruments • Preparing solutions
Measurement	• Using measuring instruments

The five general concepts and the two categories of techniques are covered in the examination. It is not necessary, however, to include all the compulsory concepts for a given general concept. Similarly, it is not necessary to include all the techniques for a given category of techniques.

For the knowledge targeted by the evaluation of the competencies:

Practical Part:

- At least one of the general concepts must be covered.
- The two categories of techniques must be covered. For these two categories, at least three techniques listed above must be covered, including *Safely using materials and equipment*.

Theory Part:

- At least three general concepts must be covered, among which, a representative sample of the compulsory concepts must be covered.

For the knowledge targeted by explicit evaluation:

Theory Part:

- At least three general concepts must be covered; those not covered in the evaluation of competencies are to be given priority.
- Priority is given to compulsory concepts that were not covered in the evaluation of competencies.

Specifications for the Evaluation Instruments

Examination: Number of Parts, Sections, Procedure and Duration

The examination consists of two parts that must be administered during different evaluation sessions.

Total duration: 240 minutes

Practical Part*: Evaluation of Competencies 1 and 3
Duration: 120 minutes

Theory Part: Evaluation of Competencies section and Explicit Evaluation of Knowledge section
Duration: 120 minutes

*The entire evaluation session for the practical part is carried out in a laboratory, workshop or other appropriate location.

Examination Content

Practical Part

This part involves a scenario and tasks from the *Research* family of situations designed to evaluate the development of Competencies 1 and 3. The adult learner must solve a problem related to the content of the course using the experimental method, which includes:

- representing the situation
- developing a plan of action
- implementing the plan of action
- analyzing the results
- providing a solution or a conclusion that is related to the goal or hypothesis

Theory Part

The Evaluation of Competencies section evaluates the development of Competencies 2 and 3. The adult learner analyzes scenarios and carries out tasks related to the *Expertise* family of situations. These scenarios each cover an issue or technological application related to the content of the course. These analyses involve carrying out four or five tasks. Each task must belong to one of the following categories:

- Providing an explanation
- Providing an opinion
- Providing a calculation
- Providing a representation

An examination must include at least three categories of tasks.

The Explicit Evaluation of Knowledge section includes six to eight questions and is devoted to the explicit evaluation of certain knowledge.

When completing the two parts of the examination, the adult learner has access to a list of formulas and a periodic table of the elements, which are appended to the *Adult's Booklet*. A copy of these documents is also provided in the appendix of this document.

Information-Gathering Tools

The following tools are used to gather information:

- Practical Part:
  - the *Adult's Booklet*
  - the Checklist, which is designed for the invigilator to record their observations of the adult learner's work.

- Theory Part:
  - the *Adult's Booklet*

Authorized Materials

For the two parts of the examination:

- Additional blank sheets of paper
- Calculator with or without a graphic display
  Information about using the calculator:
  - The data and programs stored in the calculator's memory must be deleted before and after the examination.

For the practical part of the examination:

- Laboratory materials and equipment required for the experiment

Assessment Tools

The criterion-referenced rubric is the assessment tool used by the teacher for the evaluation of the competencies. Criterion-referenced interpretation involves comparing the information gathered with the expected outcomes[4]. The rubrics are found in the appendix of this document as well as in the *Marking Guide* and the *Adult's Booklet*. They include the following rating scale:

Competency development:

- Advanced
- Thorough
- Acceptable
- Partial
- Minimal

For each part of the examination, the teacher is provided with an information-gathering tool. The use of information-gathering tools is optional. These tools can be found in the *Marking Guide*.

For the Explicit Evaluation of Knowledge section in the theory part, an answer key is provided in the *Marking Guide*.

4. Québec, Ministère de l'Éducation du Québec, *Policy on the Evaluation of Learning* (Québec: Gouvernement du Québec, 2003), 28-29.

Pass Mark

The pass mark is 60% for the examination as a whole.

Retakes

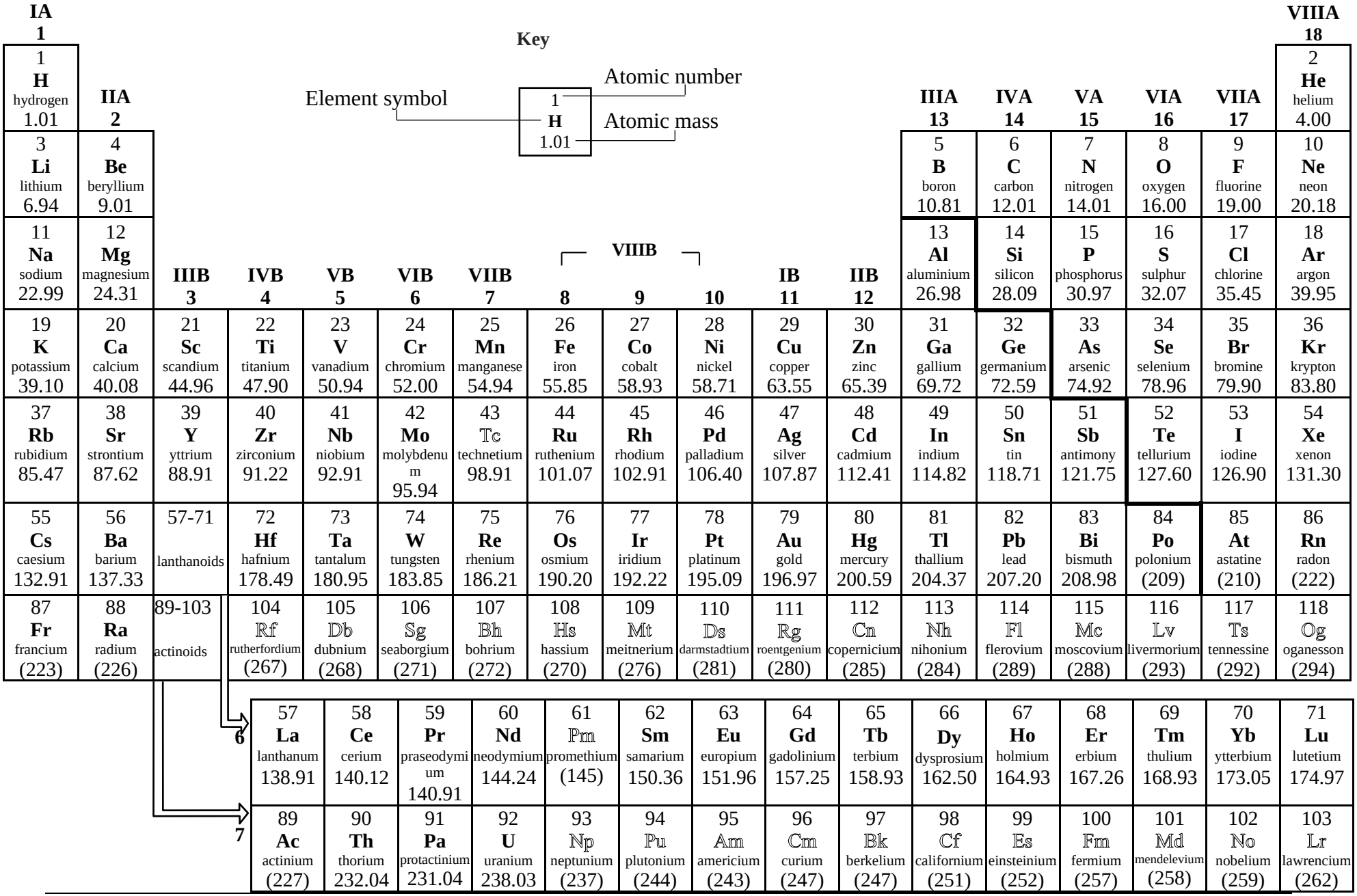
The adult learner may retake each part (practical or theory) of the examination separately.

APPENDIX I – LIST OF FORMULAS AND PERIODIC TABLE OF THE ELEMENTS

List of Formulas

$C_{(g/L)} = \frac{m_{(solute)}}{V_{(solution)}}$	$C_{(g/L)}$ $m_{(solute)}$ $V_{(solution)}$	Concentration of the solution (g/L) Mass of the solute (g) Volume of the solution (L)
$C_{(\% \text{ m/m})} = \frac{m_{(solute)}}{m_{(solution)}} \times 100$	$C_{(\% \text{ m/m})}$ $m_{(solute)}$ $m_{(solution)}$	Concentration of the solution (number of grams of solute per 100 g of solution) (% m/m) Mass of the solute (g) Mass of the solution (g)
$C_{(\% \text{ m/V})} = \frac{m_{(solute)}}{V_{(solution)}} \times 100$	$C_{(\% \text{ m/V})}$ $m_{(solute)}$ $V_{(solution)}$	Concentration of the solution (number of grams of solute per 100 mL of solution) (% m/V) Mass of the solute (g) Volume of the solution (mL)
$C_{(\% \text{ V/V})} = \frac{V_{(solute)}}{V_{(solution)}} \times 100$	$C_{(\% \text{ V/V})}$ $V_{(solute)}$ $V_{(solution)}$	Concentration of the solution (number of millilitres of solute per 100 mL of solution) (% V/V) Volume of the solute (mL) Volume of the solution (mL)
$C_{(ppm)} = \frac{m_{(solute)}}{m_{(solution)}} \times 10^6$	$C_{(ppm)}$ $m_{(solute)}$ $m_{(solution)}$	Concentration of the solution (number of grams of solute per 1 000 000 g of solution) (ppm) Mass of the solute (g) Mass of the solution (g)
$C_1V_1 = C_2V_2$	C_1 V_1 C_2 V_2	Concentration of the initial solution Volume of the initial solution Concentration of the final solution Volume of the final solution
$\rho = \frac{m}{V}$	ρ m V	Density (g/mL) Mass of the object or liquid (g) Volume of the object or liquid (mL)

PERIODIC TABLE OF THE ELEMENTS



APPENDIX II – CRITERION-REFERENCED RUBRICS

Adult General Education

EVALUATION

Criterion-Referenced Rubrics

_____
Adult learner's name

_____
Teacher's name

_____
Date

Diversified Basic Education Program
Science and Technology

Course
General Science 1
TSG-4059-2

Competency 1 **Competency 3**	**Seeks answers or solutions to scientific or technological problems** **Communicates in the languages used in science and technology**	**40%**

Instructions:

- **For each row in the rubric, circle the statement that corresponds to the work shown by the adult learner.**[5] Then indicate, in the right-hand column, the number of marks corresponding to the statement circled.
- Calculate the total number of marks earned and record it in the *Examination Result Sheet*.

Rating Scale / **Evaluation Criteria**	**Advanced** competency development	**Thorough** competency development	**Acceptable** competency development	**Partial** competency development	**Minimal** competency development	**Mark**
1.1 Appropriate representation of the situation	Accurately reformulates the goal of the experiment and formulates a hypothesis related to the context. **2**		Briefly reformulates the goal of the experiment. **1**			**/2**
	Identifies all of the scientific principles and techniques related to the problem to be solved. **3**		Identifies some of the scientific principles and techniques related to the problem to be solved. **2**		Identifies very few of the scientific principles and techniques related to the problem to be solved. **1**	**/3**

5. Special Case: Assign a mark of 0 when the work shown by the adult learner does not correspond to any of the statements in a row of the rubric.

Competency 1 **Competency 3**	**Seeks answers or solutions to scientific or technological problems** **Communicates in the languages used in science and technology**	**40%**

Instructions:

- **For each row in the rubric, circle the statement that corresponds to the work shown by the adult learner.**[6] Then indicate, in the right-hand column, the number of marks corresponding to the statement circled.
- Calculate the total number of marks earned and record it in the *Examination Result Sheet*.

Rating Scale / **Evaluation Criteria**	**Advanced** competency development	**Thorough** competency development	**Acceptable** competency development	**Partial** competency development	**Minimal** competency development	**Mark**
1.2 Development of a suitable plan of action	Selects the resources (e.g. materials, equipment, tools, quantities) that enable them to come up with an accurate answer to the problem. **2**		Selects the resources (e.g. materials, equipment, tools, quantities) that enable them to come up with an acceptable answer to the problem. **1**			**/2**
	Develops an efficient[7] plan of action that enables them to come up with an accurate answer to the problem. **5**	Develops a plan of action that enables them to come up with an appropriate answer to the problem. **4**	Develops a plan of action that enables them to come up with an acceptable answer to the problem. **3**	Develops a plan of action that enables them to come up with an approximate answer to the problem. **2**		**/5**
	Develops a plan of action without any intervention on the part of the invigilator. **4**	Develops a plan of action with one intervention on the part of the invigilator. **3**	Develops a plan of action with two interventions on the part of the invigilator. **2**	*Note:* *This step is related to the* Decision Tree*. The number of interventions on the part of the invigilator is indicated in a table in the* Adult's Booklet*. If more than two interventions are required on the part of the invigilator, the adult learner is provided with a valid plan of action. A mark of 0 is then allotted for this step.*		**/4**

6. Special Case: Assign a mark of 0 when the work shown by the adult learner does not correspond to any of the statements in a row of the rubric.
7. A plan of action is considered efficient if the most appropriate steps for dealing with the problem are listed.

Competency 1 **Competency 3**	**Seeks answers or solutions to scientific or technological problems** **Communicates in the languages used in science and technology**	**40%**

Instructions:

- **For each row in the rubric, circle the statement that corresponds to the work shown by the adult learner.**[8] Then indicate, in the right-hand column, the number of marks corresponding to the statement circled.
- Calculate the total number of marks earned and record it in the *Examination Result Sheet*.

Evaluation Criteria / **Rating Scale**	**Advanced** competency development	**Thorough** competency development	**Acceptable** competency development	**Partial** competency development	**Minimal** competency development	**Mark**
1.3 Appropriate implementation of the plan of action	Correctly carries out all of the experimentation techniques. **4**		Correctly carries out some of the experimentation techniques. **3**	Has difficulty carrying out some of the experimentation techniques. **2**	Has difficulty carrying out most of the experimentation techniques. **1**	**/4**
	Correctly carries out all of the measurement techniques. **4**		Correctly carries out some of the measurement techniques. **3**	Has difficulty carrying out some of the measurement techniques. **2**	Has difficulty carrying out most of the measurement techniques. **1**	**/4**
	Always works safely. **2**		Usually works safely. **1**			**/2**
	Gathers all the data and uses the appropriate types of representation. **3**		Gathers most of the data and uses the appropriate types of representation. **2**		Gathers some useful data. **1**	**/3**

8. Special Case: Assign a mark of 0 when the work shown by the adult learner does not correspond to any of the statements in a row of the rubric.

Competency 1 **Competency 3**	**Seeks answers or solutions to scientific or technological problems** **Communicates in the languages used in science and technology**	**40%**

Instructions:

- **For each row in the rubric, circle the statement that corresponds to the work shown by the adult learner.**[9] Then indicate, in the right-hand column, the number of marks corresponding to the statement circled.
- Calculate the total number of marks earned and record it in the *Examination Result Sheet*.

Rating Scale / **Evaluation Criteria**	**Advanced** competency development	**Thorough** competency development	**Acceptable** competency development	**Partial** competency development	**Minimal** competency development	**Mark**
1.4 Development of relevant explanations, solutions or conclusions	Presents a correct and complete analysis. **3**		Presents a correct but incomplete analysis. **2**		Presents an analysis that is to a large degree inappropriate. **1**	**/3**
	Provides a relevant, complete and detailed solution or conclusion. **5**	Provides a relevant and fairly complete solution or conclusion. **4**	Provides a relevant but incomplete solution or conclusion. **3**	Provides a solution or conclusion that is to a large degree inappropriate. **2**	Provides a solution or conclusion that is to a very large degree inappropriate. **1**	**/5**
	Provides very clear answers that fully comply with scientific and technological terminology, standards and conventions. **3**		Provides clear answers that comply with scientific and technological terminology, standards and conventions. **2**		Provides answers that partially comply with scientific and technological terminology, standards and conventions. **1**	**/3**

Total number of marks earned for Competencies 1 and 3
/40

9. Special Case: Assign a mark of 0 when the work shown by the adult learner does not correspond to any of the statements in a row of the rubric.

Competency 2 **Competency 3**	**Makes the most of [their] knowledge of science and technology** **Communicates in the languages used in science and technology**	**40%**

Instructions:

- **For each row in the rubric, circle the statement that corresponds to the work shown by the adult learner.**[10] Then indicate, in the right-hand column, the number of marks corresponding to the statement circled.
- Calculate the total number of marks earned and record it in the *Examination Result Sheet*.

Rating Scale / **Evaluation Criteria**	**Advanced** competency development	**Thorough** competency development	**Acceptable** competency development	**Partial** competency development	**Minimal** competency development	**Mark**
2.1 Appropriate interpretation of the issue	Identifies all of the relevant information and the scientific and technological concepts needed to deal with the situations. **5**	Identifies almost all of the relevant information and the scientific and technological concepts needed to deal with the situations. **4**	Identifies most of the relevant information and the scientific and technological concepts needed to deal with the situations. **3**	Identifies little information and few concepts needed to deal with the situations. **2**	Identifies very little information and very few concepts needed to deal with the situations. **1**	**/5**

10. Special Case: Assign a mark of 0 when the work shown by the adult learner does not correspond to any of the statements in a row of the rubric.

Competency 2 **Competency 3**	**Makes the most of [their] knowledge of science and technology** **Communicates in the languages used in science and technology**	**40%**

Instructions:

- **For each row in the rubric, circle the statement that corresponds to the work shown by the adult learner.**[11] Then indicate, in the right-hand column, the number of marks corresponding to the statement circled.
- Calculate the total number of marks earned and record it in the *Examination Result Sheet*.

Rating Scale / Evaluation Criteria	**Advanced** competency development	**Thorough** competency development	**Acceptable** competency development	**Partial** competency development	**Minimal** competency development	**Mark**
2.2 Relevant use of scientific and technological knowledge	Provides appropriate, complete and detailed explanations regarding issues and/or technological applications. **12**	Provides appropriate and nearly complete explanations regarding issues and/or technological applications. **10**	Provides appropriate but incomplete explanations regarding issues and/or technological applications. **7**	Provides explanations that are to a large degree inappropriate regarding issues and/or technological applications. **4**	Provides explanations that are to a very large degree inappropriate regarding issues and/or technological applications. **2**	**/12**
	Supports their opinion or choice regarding issues and/or technological applications using relevant, complete and detailed justifications. **10**	Supports their opinion or choice regarding issues and/or technological applications using relevant and nearly complete justifications. **8**	Supports their opinion or choice regarding issues and/or technological applications using relevant but incomplete justifications. **6**	Supports their opinion or choice regarding issues and/or technological applications using justifications that are to a large degree inappropriate. **4**	Supports their opinion or choice regarding issues and/or technological applications using justifications that are to a very largely degree inappropriate. **2**	**/10**
	Correctly represents all of the relevant elements. **8**	Correctly represents almost all of the relevant elements. **7**	Correctly represents most of the relevant elements. **5**	Produces a representation of the relevant elements that is to a large degree inappropriate. **3**	Produces a representation of the relevant elements that is to a very large degree inappropriate. **2**	**/8**

11. Special Case: Assign a mark of 0 when the work shown by the adult learner does not correspond to any of the statements in a row of the rubric.

Competency 2 Makes the most of [their] knowledge of science and technology **Competency 3 Communicates in the languages used in science and technology**	**40%**

Instructions:

- **For each row in the rubric, circle the statement that corresponds to the work shown by the adult learner.** [12]Then indicate, in the right-hand column, the number of marks corresponding to the statement circled.
- Calculate the total number of marks earned and record it in the *Examination Result Sheet*.

Rating Scale / **Evaluation Criteria**	**Advanced** competency development	**Thorough** competency development	**Acceptable** competency development	**Partial** competency development	**Minimal** competency development	**Mark**
2.3 Appropriate formulation of explanations or solutions	Provides clear and structured answers that comply with scientific and technological terminology, standards and conventions. **5**	Usually provides clear and structured answers that comply with scientific and technological terminology, standards and conventions. **4**	Usually provides comprehensible answers, despite there being problems with regard to structure and compliance with scientific and technological terminology, standards and conventions. **3**	Provides answers that are to a large degree incomprehensible. **2**	Provides answers that are to a very large degree incomprehensible. **1**	**/5**

Total number of marks earned for Competencies 2 and 3
/40

12. Special Case: Assign a mark of 0 when the work shown by the adult learner does not correspond to any of the statements in a row of the rubric.

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