



# Evaluation of Gulf States **MATH & SCIENCE** Text Books

**SUMMARY**  
**Fainal Report**  
January 2012

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# **Evaluation of Gulf States Math and Science**

## **Textbooks**

### **Final Report**

**January, 2012**



### **Summary**



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## تقديم

قرر المؤتمر العام السابع عشر لمكتب التربية العربي لدول الخليج تنفيذ مشروع لتطوير مناهج الرياضيات والعلوم الطبيعية في التعليم العام عن طريق تبني أفضل السلاسل العالمية في هذا المجال، وقد قام المكتب بتنفيذ قرار المؤتمر العام، وذلك باستعراض السلاسل العالمية، واختيار السلسلة المناسبة من بينها، ومن ثم استدرج العروض لتنفيذ المشروع واختيار المناسب منها، وبناءً عليه قامت وزارتا التربية والتعليم في المملكة العربية السعودية ومملكة البحرين بالتعاقد على تنفيذ المشروع مع بيت خبرة محلي، وفق مواصفات وتفصيلات محددة.

وحيث إن بعض مخرجات المشروع المختلفة والمتمثلة في الكتب الدراسية وما يرتبط بها من كتب أخرى قد تم إنجازها، فإنه أصبح من المهم إجراء تقييم لتلك المخرجات لضمان توافر الجودة المطلوبة، وللوفاء بالتزامات مكتب التربية العربي لدول الخليج في هذا المشروع الحيوي المهم. وتحقيقاً لذلك تم التعاقد مع بيت خبرة مستقل لإعداد دراسة تقييمية نفذها فريق متخصص برئاسة كل من :

- البروفسور مراد جرداق - الجامعة الأمريكية في بيروت
- البرفسور صوما بوجودة - الجامعة الأمريكية في بيروت

وقد تناولت الدراسة الجوانب الآتية:

١. مناسبة موازنة النصوص المترجمة لفلسفة النصوص في الكتب الأصلية.
٢. مدى وفاء النسخة المترجمة بالمفاهيم العلمية المتضمنة في النسخة الأصلية.
٣. مناسبة موازنة لغة النصوص المترجمة للمستويات التعليمية لطلبة الدول الأعضاء في مكتب التربية العربي لدول الخليج.
٤. مناسبة موازنة التعريب في الكتب المترجمة لخدمة المفاهيم الرياضية والعلمية.
٥. مناسبة موازنة الكتب للخصوصية الثقافية للدول الأعضاء في مكتب التربية العربي لدول الخليج.

ومكتب التربية العربي لدول الخليج وهو ينجز هذه الدراسة ليأمل أن يكون في ذلك إسهاماً مع وزاراتنا الموقرة في تجويد منتجات المشروع وتحقيق أهدافه.

والله من وراء القصد

د.علي بن عبد الخالق القرني

المدير العام

لمكتب التربية العربي لدول الخليج



## Executive Summary

The purpose of the study was to evaluate the math and science textbooks translated to Arabic and adopted by the Ministries of Education in the Gulf States. These textbooks include the students' textbooks, practice books, and teachers' guides.

The textbook evaluation team included eight math and science educators. This team was divided into two sub-teams; a math sub-team (3 members) supervised by the principal investigator in mathematics (Professor Murad Jurdak) and a science sub-team (5 members) supervised by the principal investigator in science (Professor Saouma BouJaoude).

### Evaluation Criteria

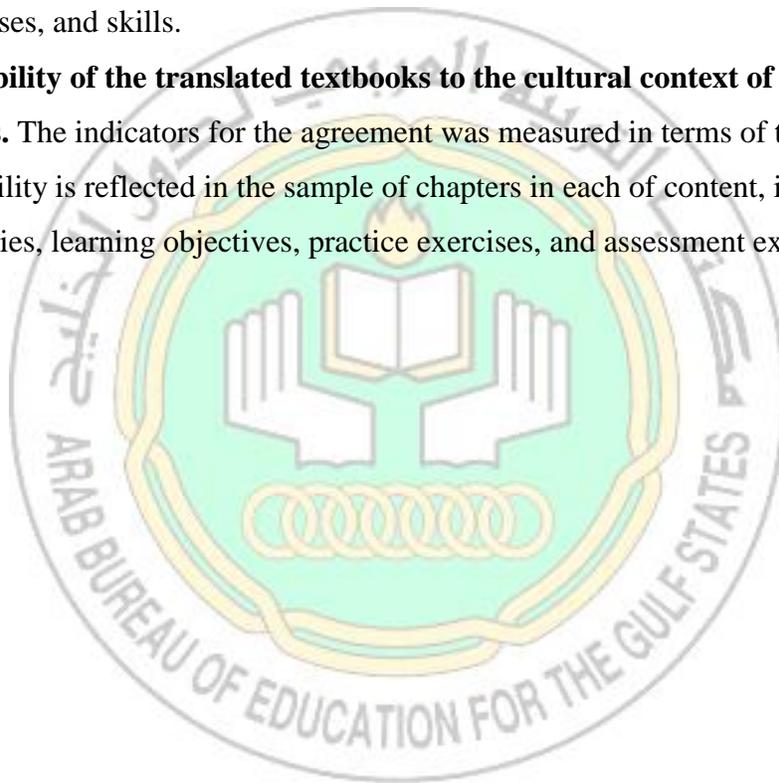
The five criteria that were used in the evaluation of all books were adapted from the literature on textbook evaluation to fit the requirements of this study. The criteria and indicators are:

- 1. Agreement of the translated Arabic book with that of the English book.** The indicators for the agreement were measured in terms of the extent the agreement is reflected in the sample of chapters in each of the following:
  - Table of content of the textbook
  - Agreement of the translated Arabic book with that of the English book in definitions, explanations, activities, learning objectives, practice exercises, assessment. Exercises, figures and illustrations
- 2. Alignment of the textbooks with the philosophy of included in the Arabic textbook.** The indicators for the agreement were measured in terms of the extent the alignment is reflected in the sample of chapters in each of content, activities, learning objectives, practice exercises, assessment exercises, and skills.
- 3. Suitability of the Arabic language in the translated textbooks to the educational level of Gulf States students.** The indicators for the agreement were measured in terms of the extent the suitability is reflected in the sample of chapters in each of length and complexity of sentences, diversity of language



structures, number of concepts, reuse of technical terms in subsequent lessons and chapters, clarity of definitions of technical terms, using concrete examples to illustrate concepts, and redundancy of terms and sentences with no educational benefit.

4. **Suitability of the Arabization of the translated textbooks to serve the math and science concepts.** The indicators for the agreement were measured in terms of the extent the suitability is reflected in the sample of chapters in each of content, illustrations, activities, learning objectives, practice exercises, assessment exercises, and skills.
5. **Suitability of the translated textbooks to the cultural context of the Gulf States.** The indicators for the agreement was measured in terms of the extent the suitability is reflected in the sample of chapters in each of content, illustrations, activities, learning objectives, practice exercises, and assessment exercises.





## Methodology

### Sample

A 50% sample of the chapters in each textbook for each of the two semesters was selected to represent the content of the book. The corresponding chapters in the practice book and the teacher book were considered part of the sample.

### Evaluation Forms

Two evaluation forms were developed. The first evaluation form was intended to evaluate the textbooks on the criteria with exception of agreement between the English and Arabic textbooks which was evaluated by the second form.

### Procedure

A set of guidelines were developed in cooperation with the evaluation teams. Evaluators were asked to evaluate each chapter separately, and evaluate teachers' guides in conjunction with the textbooks and practice book. Moreover, evaluators were asked to fill out one evaluation form for each chapter for the set made up of the textbook, practice book and teacher's manual. Then, a report was prepared for each set made up of the textbook, practice book, and teacher's manual. This report included a section on each criterion on the Form with a summary of strengths and weaknesses along with comments by the evaluator. Furthermore, each report was reviewed by the team leader who provided feedback to the evaluators with recommendations for change. Then, a meeting for the whole team was held to share the feedback with all team members. This process continued until agreement was reached among team members. At this stage team members were asked to complete the evaluations and submit them to the respective team leaders who read the reports and provided feedback to evaluators, who considered the feedback and submitted final evaluation forms and reports.

### Summary of Findings from the Evaluation of Gulf States Science Textbooks

#### Agreement of the translated Arabic book with that of the English book

1. There are many chapters or sections of lectures that were not translated. Moreover, many chapters in the Arabic version are assembled from different sections of chapters in the English versions. Finally, in many situations there was no one-to-one correspondence between the original and the translated textbooks in that the Arabic



textbooks included chapters and topics from several English textbooks at different grade levels.

2. Most of the definitions of the vocabulary words found in the translated Arabic version are accurately translated from the original English textbook. However, there are some differences between the English and Arabic versions in terms of the *extent* to which concepts are explained and elaborated with less elaboration in the Arabic textbooks. However, in many situations the sentences used in the Arabic textbooks were longer and more complex than those used in the English textbooks.
3. In general, all the diagrams and illustrations in the Arabic version are exactly the same as the ones found in the English version. In fact, most of the differences in the illustrations are due to culture.

#### **Alignment of the textbooks with the philosophy of included in the Arabic textbook**

1. Many activities found in the Arabic and English versions of the textbooks are the same. However, there are differences due to the fact that many activities that require higher level cognitive thinking were not translated. Specifically, there were differences in the types and cognitive levels of the activities between the translated and the English versions of the textbooks. For example, the number of lab activities in the translated textbooks was significantly smaller than those in the translated textbooks and the cognitive level of some of these activities in the translated textbooks was lower than those in the English textbooks. Finally, there is a smaller number of reading activities in the translated textbooks than in the original ones.
2. The learning objectives in the Arabic textbooks are not aligned with the philosophy because they are mostly at the lower cognitive levels of Bloom's taxonomy.
3. Many of the assessment exercises found in the Arabic version are similar to those found in the English version. Any differences in the exercises were due to the fact that some of the lessons in the English versions were not included in the chapters of the Arabic versions. One exception is that there are less higher level assessment exercises such as "Think, Talk, and Write" exercises in the Arabic than in the English versions of the textbooks



### **Suitability of the Arabic language in the translated textbooks to the educational level of Gulf States students**

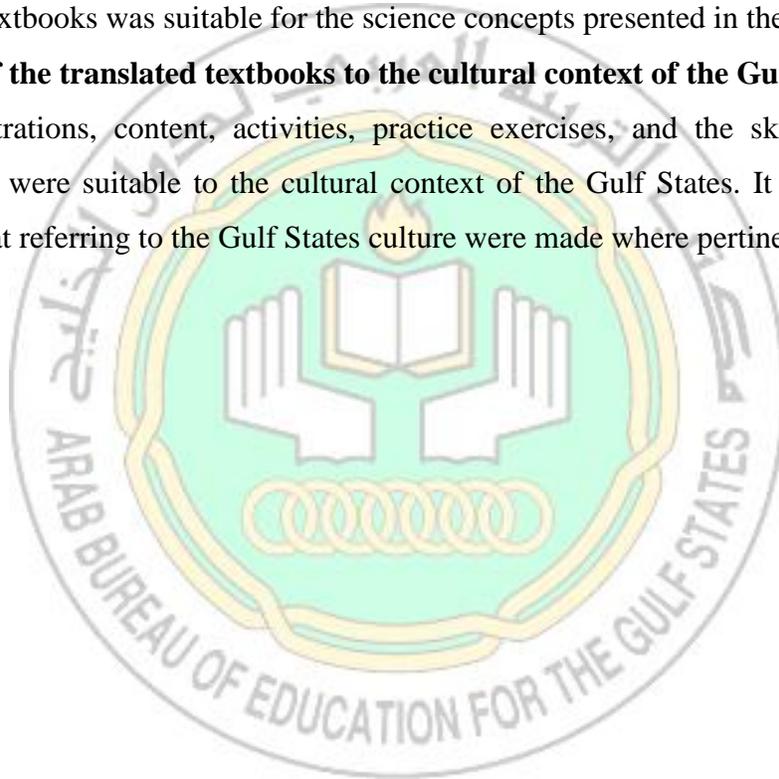
1. In general the Arabic language in the science textbooks was suitable for the educational level of students in terms of diversity of language structures and using concrete examples to illustrate concept.

### **Suitability of the Arabization of the translated textbooks to serve the science concepts**

1. The Arabization of the activities, assessment exercises, content and skills in the science textbooks was suitable for the science concepts presented in the textbooks.

### **Suitability of the translated textbooks to the cultural context of the Gulf States**

1. The illustrations, content, activities, practice exercises, and the skills in science textbooks were suitable to the cultural context of the Gulf States. It is evident that attempts at referring to the Gulf States culture were made where pertinent or relevant.





## **Summary of Findings from the Evaluation of the Gulf States Mathematics Textbooks**

### **Agreement of the translated Arabic book with that of the English book**

1. Many chapters of the English books were not translated to Arabic.
2. The comparison of the content showed that there were large differences between the original textbook and its translated counterpart in activities and assessment exercises. The large differences in the activities were due to the existence of several important sections in the original textbook that were absent in the Arabic version. These sections contain activities, problems, and projects that are not found in the translated version. The large differences in the assessment exercises were due to the presence of some assessment sections in the original textbook that are not found in the translated version.

### **Alignment of the textbooks with the philosophy of included in the Arabic textbook**

1. In general, there seems to be little evidence of alignment of the books with the philosophy. The content, activities and skills seem to be generally aligned with the philosophy stated in the Arabic textbooks,
2. The main problem is with the learning objectives, the exercises, and assessment tasks which seem not to be aligned with the declared philosophy of the books. These were not student – centered, did not target higher order thinking and did not use any technology as stated in the philosophy.
3. There is some variation in the alignment with the philosophy with elementary level textbooks showing the least alignment with the stated philosophy and the intermediate showing the most alignment.

### **Suitability of the Arabic language in the translated textbooks to the educational level of the Gulf States students**

1. The translated books, except for few instances, were satisfactory in terms of the suitability of the Arabic language to the educational level of the Gulf States students



### **Suitability of the Arabization of the translated textbooks to serve the science concepts**

1. The translated books, except for few instances, were satisfactory in terms of serving the learning of mathematical concepts

### **Suitability of the translated textbooks to the cultural context of the Gulf States**

1. The translated books, except for few instances, were satisfactory in terms of serving the learning of mathematical concepts.





## Chapter 1

### Textbook Evaluation Criteria and Methodology

The purpose of the study was to evaluate the math and science textbooks translated to Arabic and adopted by the Gulf States Ministries of Education. These textbooks include the students' textbooks, practice books, and teachers' guides. Below, we present a description of the evaluation team, the criteria and methodology used in the study including the alignment of the different elements of the textbooks and the agreement of translated Arabic textbooks with the English textbooks, general requirements for performing the evaluation, suggestions for filling out textbook evaluation forms, suggestions for filling out the term reports, and procedures followed to conduct the evaluation study.

#### Evaluation Team

The textbook evaluation team included eight math and science educators. This team was divided into two sub-teams; a math sub-team (3 members) supervised by the principal investigator in mathematics (Professor Murad Jurdak) and a science sub-team (5 members) supervised by the principal investigator in science (Professor Saouma BouJaoude).

#### Evaluation Criteria

Five criteria were used in the evaluation of all books. These criteria were adapted from the literature on textbook evaluation to fit the requirements of this study. The criteria and indicators are:

##### 1. Agreement of the translated Arabic book with that of the English book. .

The indicators for the agreement were measured in terms of the extent the agreement is reflected in the sample of chapters in each of the following:

- *Table of content of the textbook*
- *Agreement of the translated Arabic book with that of the English book*
  - *Definitions and explanations in the chapter*
  - *Activities included in the chapter*
  - *Learning objectives*
  - *Practice exercises*



- *Assessment exercises*
- *Figures, pictures and illustrations*

**2. Alignment of the textbooks with the philosophy of included in the Arabic textbook.** The indicators for the agreement were measured in terms of the extent the alignment is reflected in the sample of chapters in each of the following:

- *Content of the Chapter*
- *Activities included in the chapter*
- *Learning objectives*
- *Practice exercises*
- *Assessment exercises*
- *Skills*

**3. Suitability of the Arabic language in the translated textbooks to the educational level of the Gulf States students.** The indicators for the agreement were measured in terms of the extent the suitability is reflected in the sample of chapters in each of the following

- *Length of sentences*
- *Complexity of sentences*
- *Diversity of language structures*
- *Number of concepts per chapter*
- *Reuse of technical terms in subsequent lessons and chapters*
- *Clarity of definitions of technical terms*
- *Using concrete examples to illustrate concepts*
- *Redundancy of terms and sentences with no educational benefit.*

**4. Suitability of the Arabization of the translated textbooks to serve the math and science concepts.** The indicators for the agreement were measured in terms of the extent the suitability is reflected in the sample of chapters in each of the following:

- *Illustrations*



- *Content*
- *Activities*
- *Practice Exercises*
- *Assessment exercises*
- *Skills*

**5. Suitability of the translated textbooks to the cultural context of the Gulf States.** The indicators for the agreement were measured in terms of the extent the suitability is reflected in the sample of chapters in each of the following:

- *Illustrations*
- *Content*
- *Activities*
- *Practice Exercises*
- *Assessment exercises*

### **Sample of Chapters**

A 50% sample of the chapters in each textbook for each of the two semesters was selected to represent the content of the book. The corresponding chapters in the practice book and the teacher book were considered part of the sample. Thus 23 semester/samples of chapters from mathematics books and 36 science samples were selected. Each sample from each textbook was selected to represent the variety of chapters in that textbook.

### **Evaluation Forms**

Two evaluation forms were developed. The first evaluation form (Appendix 1.1) was intended to evaluate the textbooks on the four criteria: a) Alignment of the translated texts to the philosophy of the, b) suitability of the Arabic language in the translated textbooks to the educational level of the Gulf States students, c) suitability of the Arabization of the translated textbooks to serve the math and science concepts, and d) suitability of the translated textbooks to the cultural context of the Gulf States. The open-ended items included a) Comments and explanation on implementing the indicators, and additional indicators and other comments.



The second evaluation form (Appendix 1.2) was intended to evaluate the agreement between the English and Arabic textbooks in terms of definitions and explanations in the chapter, activities included in the chapter, learning objectives, practice exercises, assessment exercises, and figures, pictures and illustrations. In addition, the form required evaluators to compare the table of contents of the English version with the tables of content of the Arabic textbooks at each grade level. In addition, for grades 10, 11, and 12 they were asked to list the missing chapters in the report of Grade 12. For the Table of Content, they were required to compare the titles of the chapters in the tables of content between the Arabic and English versions and based on counting the differences in the titles between them. Additionally, they were required to include the results of their comparison in the report along with copies of the coded table of contents.

It is worth noting that some difficulties were faced when evaluating agreement, especially at the preparatory (7-9) and secondary (10-12) levels. These difficulties resulted from the fact that in many situations the content of one English textbooks were divided among three Arabic textbooks as a result of the differences between the American and the Gulf States Educational systems at the preparatory (7-9) and secondary (10-12) levels. For example while American in most USA schools students take one year of biology, one year of chemistry, and one year of physics, Gulf States students take each of these subjects over a three year period.

### **General Requirements for Performing the Evaluation**

In addition, evaluators were asked to evaluate each chapter separately, and evaluate teachers' guides in conjunction with the textbooks and practice book. Moreover, evaluators were asked to fill out one evaluation form for each chapter for the set made up of the textbook, practice book and teacher's manual. Then, a report was prepared for each set made up of the textbook, practice book, and teacher's manual. This report included a section on each criterion on the Form with a summary of strengths and weaknesses along with comments by the evaluator. Furthermore, each report was reviewed by the team leader who provided to the evaluators with recommendations for change.



## **Guidelines for Filling out Book Evaluation Forms**

Evaluators were required to apply the following guidelines in filling out the textbook evaluations forms

1. For each criterion the assessment should be self-contained i.e. lend itself to be read and understood without necessarily going back to the textbooks.
2. Each example and/or comment should include reference to the indicator to which it belongs (one way of doing it is to put the number of the indicator, for example 1.2, 1.4...)
3. The examples and/or comments should have a clear reference to the standard to which it is compared. For example, if the comment states the “little use of technology” then the comment should mention that this is not aligned with the philosophy as stated in the textbooks. It is important that the statement of the relevant philosophy as it appears in the textbook should be included
4. The comments should be supported by either explanations and /or typical examples. The example should be explicitly stated and not only referred to a page number in the textbook.

## **Recommendations for Filling out the Term Report**

Evaluators were required to apply the following suggestions to fill out the term reports:

1. The report should be self- contained i.e. lend itself to be read and understood without necessarily going back to the textbooks.
2. Each report should include a brief introduction about the methodology used. In particular, the titles of the sampled chapters should be given as well as a brief description of the criteria and the rubrics.
3. The report should include at least five headings:
  - Agreement between the English and the Arabic versions of the books
  - Alignment with the stated philosophy (a statement of the philosophy as presented in the textbook could be included)
  - Suitability of the Arabic language
  - Suitability of the Arabization



- Suitability to the cultural context
4. There should be a general conclusion for each criterion which gives an assessment of the degree to which the textbooks meet the criterion, preferably at the beginning. The conclusion should be based on positive and negative assessments of the chapters
  5. The conclusion for each criterion should reflect the assessments given in the rubrics for that criterion
  6. Examples should be included when they help the reader understand the assessment
  7. At the end of the report, a general conclusion for all criteria may be included.

### **Procedures**

The first step of the evaluation involved developing the two evaluation forms. A first draft of the forms was adapted from the literature on textbook evaluation to accommodate the purposes communicated by the Arab Bureau of Education for The Gulf States to the two principal investigators.

Following this step, a meeting was held with all members of the evaluation team to discuss the forms and get their feedback. The feedback provided by the team members was then incorporated into the forms and a meeting was held to demonstrate the use of the form to team members using a chapter from one of the books. Team members were then asked to use the form to evaluate one chapter and submit the evaluation to the principal investigators who reviewed the filled out forms.

A meeting for the whole team was held to share the feedback with all team members. This process continued until agreement was reached among team members. At this stage team members were asked to complete the evaluations and submit them to the respective team leaders who read the reports and provided feedback to evaluators, who considered the feedback and submitted final evaluation forms and reports.



## APPENDIX 1.1

### Book Evaluation Form

<b>Book Evaluation Form</b>	Subject:			
	Grade:			
	Textbook Title:			
	Chapter Title:			
	No evidence	Little evidence	Almost satisfactory	Satisfactory evidence
<b><i>Criterion/Indicator</i></b>				
<b>1. Alignment of the translated texts to the philosophy of the original textbook</b>				
<i>1.1. Content of the Chapter</i>				
<i>1.2. Activities included in the chapter</i>				
<i>1.3. Learning objectives</i>				
<i>1.4. Practice exercises</i>				
<i>1.5. Assessment exercises</i>				
<i>1.6. Skills</i>				
Illustrate by at last one example any indicator of criterion 1 given a score of less than 3				

	No evidence	Little evidence	satisfactory evidence	Satisfactory evidence
<b>2. Suitability of the Arabic language in the</b>				



<b>translated textbooks to the educational level of the Gulf States students</b>				
<i>2.1. Length of sentences</i>				
<i>2.2. Complexity of sentences</i>				
<i>2.3. Diversity of language structures</i>				
<i>2.4. Number of concepts per chapter</i>				
<i>2.5. Reuse of technical terms in subsequent lessons and chapters</i>				
<i>2.6. Clarity of definitions of technical terms</i>				
<i>2.7. Using concrete examples to illustrate concepts</i>				
<i>2.8. Redundancy of terms and sentences with no educational benefit.</i>				
Illustrate by at last one example any indicator of criterion 2 given a score of less than 3				

	No evidence	Little evidence	satisfactory evidence	Satisfactory evidence
<b>3. Suitability of the Arabization of the translated textbooks to serve the math and science concepts</b>				
<i>3.1. Illustrations</i>				
<i>3.2. Content</i>				
<i>3.3. Activities</i>				
<i>3.4. Practice Exercises</i>				
<i>3.5. Assessment exercises</i>				
<i>3.6. Skills</i>				



Illustrate by at last one example any indicator of criterion 3 given a score of less than 3

	No evidence	Little evidence	Almost satisfactory	Satisfactory evidence
<b>4. Suitability of the translated textbooks to the cultural context of the Gulf States</b>				
<i>4.1. Illustrations</i>				
<i>4.2. Content</i>				
<i>4.3. Activities</i>				
<i>4.4. Practice Exercises</i>				
<i>4.5. Assessment exercises</i>				
Illustrate by at last one example any indicator of criterion 4 given a score of less than 3				

Comments and explanation on implementing the indicator.

Additional indicators and other comments.



## APPENDIX 1.2

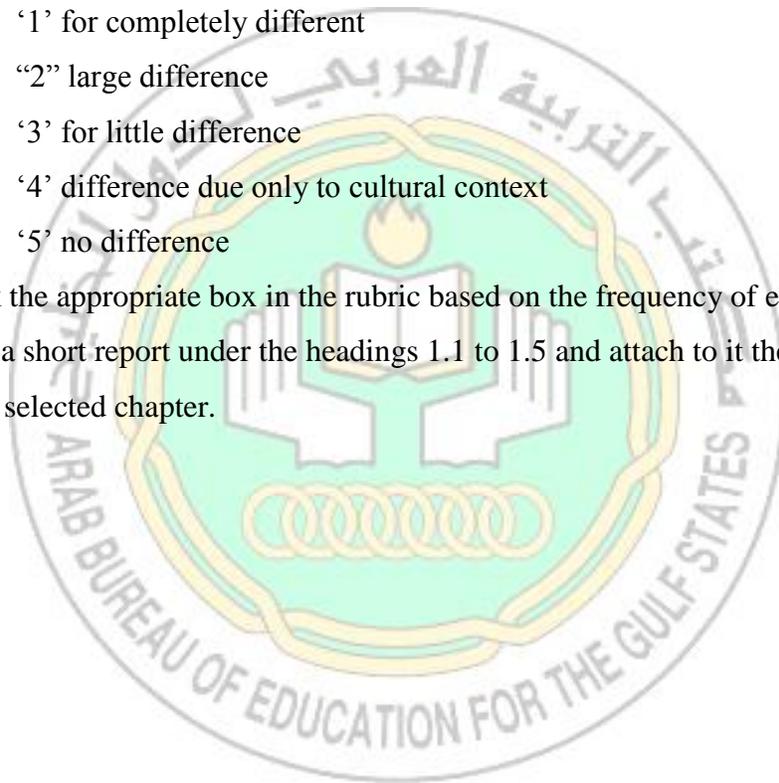
### General alignment between Arabic and English Versions

<b>Book Evaluation Form</b>	Subject: Science					
	Grade: Second Intermediate					
	Semester: ONE					
	Textbook Title: Science					
	Chapter Title: Chapter 2 States of Matter الفصل الثالث: حالات المادة					
	Completely different	Large difference	Little difference	Difference due only to	No difference	No difference
<b><i>Criterion/Indicator</i></b>						
<b>2. Agreement of the translated Arabic book with that of the English book</b>						
<i>2.1. Definitions and explanations in the chapter</i>						
<i>2.2. Activities included in the chapter</i>						
<i>2.3. Learning objectives</i>						
<i>2.4. Practice exercises</i>						
<i>2.5. Assessment exercises</i>						
<i>1.6 Figures, pictures and illustrations</i>						
<p><b>3. Table of content of the textbook:</b> Compare table of contents of the English version with the tables of content of the Arabic textbooks at each grade level. In addition, for grades 10, 11, and 12 list the missing chapters in the report of Grade 12.</p> <p>3.1. For the Table of Content, compare the titles of the chapters in the tables of content between the Arabic and English versions and based on counting the differences in the titles between them and include the results of your comparison in the report along with copies of the coded table of contents.</p>						



**Guidelines for filling this form (Item 1 only):**

1. One form is to be filled for each of the three books (student, practice, teacher) for each semester
2. You need to have a copy of the Table of Content of each book and of one chapter of the book chosen from the chapters you have already selected
3. For the chapter, for each item (for example, definition, explanation, activity...) one of the four scale points:
  - a. '1' for completely different
  - b. "2" large difference
  - c. '3' for little difference
  - d. '4' difference due only to cultural context
  - e. '5' no difference
4. Check the appropriate box in the rubric based on the frequency of each value
5. Write a short report under the headings 1.1 to 1.5 and attach to it the copies of the coded selected chapter.





## **Summary and Trends in the Results of the Translated Mathematics Textbooks**

We present in this chapter a summary of the results of the evaluation of the mathematics textbooks as well as the trends in these results. The results are based on the evaluation reports and forms that appear as Appendices (3.1 - 3.12) to this chapter .

### **Summary and Trends in the Mathematics Textbooks in Grades 1-6**

The following pages provide a summary of the evaluation of the mathematics textbooks at each grade separately, followed by a general summary of the results. This summary is based on the textbook evaluations and summary reports that are presented in Appendices 3.1-3.6 and are organized to address the five criteria included in the evaluation form. These criteria are:

- a) Agreement of the translated textbooks with the English textbooks
- b) Alignment of the translated texts to the philosophy of the original textbook,
- c) Suitability of the Arabic language in the translated textbooks to the educational level of the Gulf States students,
- d) Suitability of the Arabization of the translated textbooks to serve the math and science concepts, and
- e) Suitability of the translated textbooks to the cultural context of the Gulf States.



## **Agreement with the English Textbooks**

Each of the original textbooks was compared with each translated counterpart on definitions and explanations, activities, learning objectives, practice exercises, assessment exercises, and figures and illustrations. The comparison showed that there were large differences between the original textbook and its translated counterpart in only activities and assessment exercises.

The large differences in the activities were due to the existence of several important sections in the original textbook that were absent in the Arabic version. These sections contain activities, problems, and student projects that are not found in the translated version. The omitted sections have a lot of student-centered activities that engage students in higher-order thinking and consequently the translated books lost much of those features

The large differences in the assessment exercises were due to the presence of some assessment sections in the original textbook that are not found in the translated version. For example, in the original textbook there is a section entitled “Mid-Chapter Check” in the middle of the chapter and it includes several assessment exercises which correspond to lessons 1 to 4. Also, in several lessons in the original textbook there is a section entitled “test practice” section and spiral review section. Also, at the end of the chapter, there is a “test practice” cumulative test which covers more than one chapter. These sections are not found in the translated textbook. Also the section “Study Guide and Review” which contains review activities about the lessons of the chapter is found at



the end of the chapter in the original textbook and not found in the translated textbook.

The omission of these sections deprived the translated books from using different types of formative, summative, and cumulative assessments. Needless to say the omitted assessment sections could have provided opportunities for assessing higher-order thinking.





### **Alignment with the Philosophy of the Original Textbooks**

The content of the chapters, activities, objectives, practice exercises, assessment exercises, and skills are not quite aligned with the philosophy stated in the book, which emphasize the following principles

1. Building connections between the content of mathematics and real-life situations.
2. Presenting the content of the books in a motivating way
3. Developing different types of skills including high level thinking and justifying or looking
4. Using different strategies to solve the mathematical activities and exercises
5. Using technology in solving mathematical exercises
6. Using different types of assessments to evaluate students' learning

### **Suitability the Arabic Language to the educational level of the Gulf States students**

The analysis showed the language was appropriate for all the indicators: (1) length of the sentences, (2) complexity of sentences, (3) diversity of language structures; (4) number of concepts per chapter, (5) reuse of technical terms in subsequent lessons (6) clarity of definitions of technical words; (7) redundancy of terms and sentences with no educational benefit; and (8) using concrete examples to illustrate concepts. However, for grades 4, 5, and 6, there was a deficiency in the “diversity of language structures”. There is a repetition of the same structure of questions in several places throughout chapters. Specifically, the “if questions” having the following structure: if – verb – ... – how much would ... “If questions” are repeated in many word problems.



### **Suitability to Serve the Learning of Math Concepts**

Three indicators (the illustrations, content and activities) showed were satisfactory in that the Arabization of the translated books serve well the learning of the mathematical concepts. However, the other three indicators: practice exercises; assessment exercises and skills were not satisfactory. The reason for the weakness in the three indicators (practice exercises; assessment exercises and skills) is due mainly to the routine nature of these indicators which decrease their cognitive demand.

### **Suitability to the Cultural Context of the Gulf States.**

In general, satisfactory evidence was found with respect to all the indicators of this rubric: (1) illustrations, (2) content, (3) activities, (4) practice exercises and (5) assessment

In conclusion the results of analysis indicate that:

1. Many sections of the activities as well as the assessment exercises of the original version were deleted from the Arabic version.
2. the content of the chapters, activities, objectives, practice exercises, assessment exercises, and skills are not aligned with the philosophy stated in the book
3. The translated books were satisfactory in terms of the suitability of the Arabic language to the educational level of the Gulf States students
4. The translated books were partially satisfactory in terms of serving the learning of mathematical concepts
5. The translated books were satisfactory in terms of their suitability to the cultural context of the Gulf States.



## Summary and Trends in the Mathematics Textbooks in Grades 7-9

The following pages provide a summary of the evaluation of the mathematics textbooks at each grade separately, followed by a general summary of the results. This summary is based on the textbook evaluations and summary reports that are presented in Appendices 3.7-3.9 and are organized to address the five criteria included in the evaluation form. These criteria are:

- a) Agreement of the translated textbooks with the English textbooks
- b) Alignment of the translated texts to the philosophy of the original textbook,
- c) Suitability of the Arabic language in the translated textbooks to the educational level of the Gulf States students,
- d) Suitability of the Arabization of the translated textbooks to serve the math and science concepts, and
- e) Suitability of the translated textbooks to the cultural context of the Gulf States.

### **Agreement with the English Textbooks**

The tables of content of each of the original textbook were compared with its translated counterpart. Some chapters appear in the original textbook and do not appear in the translated textbook. Each of the original textbooks was compared with each translated counterpart on definitions and explanations, activities, learning objectives, practice exercises, assessment exercises, and figures and illustrations. In general, the comparison showed that there were large differences between the original textbook and its translated counterpart particularly in activities and assessment exercises.



The large differences in the activities were due to the existence of several important sections in the original textbook that were absent in the Arabic version. These sections contain activities, problems, and student projects that are not found in the translated version. The omitted sections have a lot of student-centered activities that engage students in higher-order thinking and consequently the translated books lost much of those features

The large differences in the assessment exercises were due to the presence of some assessment sections in the original textbook that are not found in the translated version. For example, in the original textbook there is a section entitled “Mid-Chapter Check” in the middle of the chapter and it includes several assessment exercises which correspond to lessons 1 to 4. Also, in several lessons in the original textbook there is a section entitled “test practice” section and spiral review section. Also, at the end of the chapter, there is a “test practice” cumulative test which covers more than one chapter. These sections are not found in the translated textbook. Also the section “Study Guide and Review” which contains review activities about the lessons of the chapter is found at the end of the chapter in the original textbook and not found in the translated textbook. The omission of these sections deprived the translated books from using different types of formative, summative, and cumulative assessments. Needless to say that the omitted assessment sections could have provided.

### **Alignment with the Philosophy of the Original Textbooks**

The books in the intermediate stage focus on important aspects of mathematics teaching, essentially:



1. Building solid connections between mathematical content and real-life situations
2. Presenting mathematical content using attractive & motivating ways
3. Emphasizing on the role of the student in the teaching & learning processes  
(among others, providing the student with the opportunity to employ modern techniques and communication based on practice)
4. Developing mathematical skills necessary for the wholeness and integration of mathematical content, such as mathematical communication skills, mathematical sense skills, problem solving, and higher order thinking.
5. Applying different techniques in different mathematical situations
6. Implementing the steps of the "problem solving method" and applying its different strategies in the way of thinking about mathematical problems and their solutions
7. Using a variety of assessment and evaluation methods to suit different student learning styles

In general, there seems to be almost satisfactory evidence of alignment of the books with the philosophy. In fact, the content, activities, and learning objectives show almost satisfactory evidence of alignment with the philosophy. However, there is no use of technology, except for grade 9. On the other hand the skills are fully aligned with the philosophy; whereas, not many exercises and problems of the textbook and practice book are word problems linking mathematics to its use in real life and there are few higher order tasks.



### **Suitability the Arabic Language to the educational level of the Gulf States Students**

The Arabic language used is generally suitable to the educational level of the students (satisfactory evidence of suitability of the Arabic language). There are many new vocabulary terms and symbols to be learned in each chapter, however they are well defined, illustrated and repeated throughout chapter

### **Suitability to Serve the Learning of Math Concepts**

There doesn't appear to be any problem with the suitability of the Arabization of the books to serve the mathematical concepts (satisfactory evidence).

### **Suitability to the Cultural Context of the Gulf States.**

In general, satisfactory evidence was found with respect to all the indicators of this rubric: (1) illustrations, (2) content, (3) activities, (4) practice exercises and (5) assessment

In conclusion the results of analysis indicate that:

1. The tables of content translated version do not include many lessons that are in the original version. Moreover, many sections of the activities as well as the assessment exercises of the original version were deleted from the Arabic version.
2. In general, there seems to be almost satisfactory evidence of alignment of the books with the philosophy as declared in the textbook. The content of the chapters, activities, objectives and skills were almost aligned with the philosophy, whereas, practice exercises and assessment exercises are not aligned with the philosophy stated in the book
3. The translated books were satisfactory in terms of the suitability of the Arabic language to the educational level of the Gulf students



4. The translated books were satisfactory in terms of serving the learning of mathematical concepts
5. The translated books were satisfactory in terms of their suitability to the cultural context of the Gulf States.





## **Summary and Trends in the Mathematics Textbooks in Grades 10-12**

The following pages provide a summary of the evaluation of the mathematics textbooks at each grade separately, followed by a general summary of the results. This summary is based on the textbook evaluations and summary reports that are presented in Appendices 3.10-3.12 and are organized to address the five criteria included in the evaluation form. These criteria are:

- a) Agreement of the translated textbooks with the English textbooks
- b) Alignment of the translated texts to the philosophy of the original textbook,
- c) Suitability of the Arabic language in the translated textbooks to the educational level of the Gulf students,
- d) Suitability of the Arabization of the translated textbooks to serve the math and science concepts, and
- e) Suitability of the translated textbooks to the cultural context of the Gulf States.

### **Agreement with the English Textbooks**

The tables of content of each of the original textbook were compared with its translated counterpart. The comparison shows that in general:

- Lessons from different chapters in the original textbook are put in one chapter in the translated version
- Some chapters appear in the original textbook and do not appear in the translated textbook.



- The chapters in the original textbook are listed under **units** whereas in the translated version there are no units.

Each of the original textbooks was compared with each translated counterpart on definitions and explanations, activities, learning objectives, practice exercises, assessment exercises, and figures and illustrations. In general, the comparison showed that there were large differences between the original textbooks and its translated counterparts particularly in activities, practice exercises, and assessment exercises.

The large differences in the activities were due to the existence of several important sections in the original textbook that were absent in the Arabic version. These sections contain activities, problems, and projects that are not found in the translated version. In addition, there was large difference in the activities included in both textbooks due to: (1) differences in the “high order thinking skills”; (2) more high order thinking skills activities are introduced in the original textbook.

The “large difference” in the practice exercises is due to: (1) the appearance of lessons in the original textbook that are absent in the Arabic version; and (2) more exercises are introduced in the original text in the lessons that appear in both textbook

The “large difference” in the assessment exercises in was due to several reasons: (1) the “Standardized test practice” exercises are different, (2) more standardized test practice exercises are given in the original textbook; and, (3) differences in the mid-chapter quiz assessment exercises and practice test assessment exercises.

### **Alignment with the Philosophy of the Original Textbooks**

In general, there seems to be little evidence of alignment of the books with the philosophy. Although the content, activities & skills seem to be generally aligned, the



main problem is with the learning objectives, the exercises, and assessment tasks which seem not to be aligned with the declared philosophy of the books.

To start with, the learning objectives presented at the beginning of and throughout each chapter of the textbooks and the teacher's manual are purely mathematical content oriented, without any mention of other aspects of mathematical teaching mentioned in the philosophy such as connections to real life situations or the use of modern and motivating learning strategies. Actually, there is very limited use of technology or research in activities, which are the two main modern learning strategies.

As for the exercises, although most of the activities and the solved exercises of the textbook chapters are based on real life situations, there seem to be fewer connections to everyday life in practice and assessment exercises. Furthermore, most exercises are simple direct applications of the chapter's concepts or word problems; very few are real problem solving exercises requiring higher order thinking.

In addition, there isn't much variety in the types of exercises and activities used, some exercises are almost identical with only numerical data being modified, mainly when comparing between the textbook and the practice book, and even between chapter evaluations and cumulative tests.

There is little evidence of the central and active role of the student in the learning process in contrast to the philosophy of the book which emphasizes the central role of the student.



### **Suitability the Arabic Language to the educational level of the Gulf Students**

The Arabic language used is generally suitable to the educational level of the students (almost satisfactory to satisfactory evidence of suitability of the Arabic language). There are many new vocabulary terms to be learned in each chapter; however they are well defined, illustrated and repeated throughout chapter. In some topics however, some sentences are long and difficult to understand, and some typing mistakes occur affecting the mathematical meaning.

The page layout is too condense and confusing, with too many things on one page, which is visually disturbing for the reader and conveys an impression of dense and difficult content.

### **Suitability to Serve the Learning of Math Concepts**

There is general evidence of the suitability of the Arabization of the books, except in few cases where some examples/exercises become harder or lose their meaning due to the translation which makes statements more complex. Adding to that the fact that it is difficult to read some sentences with both mathematical statements written in English (left to right) and regular statements in Arabic (right to left) on the same line, it is better to write some mathematical statements on different lines to make them more legible.

### **Suitability to the Cultural Context of the Gulf States.**

In general, the translated books reflect well the cultural context of the Gulf States including examples, activities, exercises and illustrations pertaining to the country and the culture. In rare cases, pictures and illustrations are out of context.



In conclusion the results of analysis indicate that:

1. The tables of content translated version do not include many lessons that are in the original version. Moreover, many sections of the activities as well as the assessment exercises of the original version were deleted from the Arabic version.
2. In general, there seems to be little evidence of alignment of the books with the philosophy. Although the content, activities & skills seem to be generally aligned, the main problem is with the learning objectives, the exercises, and assessment tasks which seem not to be aligned with the declared philosophy of the books.
3. The translated books, except for few instances, were satisfactory in terms of the suitability of the Arabic language to the educational level of the Gulf students
4. The translated books, except for few instances, were satisfactory in terms of serving the learning of mathematical concepts
5. The translated books were satisfactory in terms of their suitability to the cultural context of the Gulf States.



## **Summary and Trends in the Results of the Translated Science**

### **Textbooks**

We present in this chapter a summary of the results of the evaluation of the science textbooks as well as the trends in these results. The results are based on the evaluation reports and forms that appear as Appendices (2.1.1 - 2.5.12) to this chapter.

### **Summary and Trends in the Science Textbooks in Grades 1-6**

The following pages provide the trends that can be derived from the evaluations of the elementary level science textbooks (Grades 1-6). These trends are based on the textbook evaluations and summary reports that are available in Appendices 2.1.1-2.1.6 and are presented as function of the criteria included in the evaluation forms which were:

- a) Agreement of the translated Arabic textbook with that of the English textbook,
- b) Alignment of the translated texts to the philosophy of the original textbook,
- c) Suitability of the Arabic language in the translated textbooks to the educational level of the Gulf students,
- d) Suitability of the Arabization of the translated textbooks to serve the science concepts, and
- e) Suitability of the translated textbooks to the cultural context of the Gulf States.



## **Agreement of the translated Arabic Textbooks with the English Textbooks**

The tables of content of each of the original English language textbooks were compared with the translated corresponding textbooks. The comparison shows the following:

- Overall; there are large differences between the English and Arabic versions of the table of contents of the textbooks. This is apparent at many levels including: 1) the chapters/lessons that are included; 2) the integration of lessons; and 3) the activities found at the end of the lessons or at the beginning of each unit. Specifically, there are many chapters/lessons that are found in the English version but not found in the Arabic one (It is to note that there are less differences between chapters in the English and Arabic textbooks at the grades 1-4 levels than at the grades 5-6 levels), the integration of lessons in the Arabic version made them different from the English version (some chapters in the Arabic versions are combinations of lessons from different chapters in the English versions), and there are many differences at the end of the lesson activities that are included in the lessons that are common between the Arabic and English versions.

Each of the original textbooks was compared with each translated counterpart on definitions and explanations, activities, learning objectives, practice exercises, assessment exercises, and figures and illustrations. The comparison showed the following:

- While most of the definitions of the vocabulary words found in the translated Arabic version are accurately translated from the original English textbook,



there are some differences between the English and Arabic versions in terms of the *extent* to which concepts are explained and elaborated. More specifically, some information present in the English version is eliminated in the Arabic version. Moreover, there are instances where the Arabic translation did not convey the exact meaning of the concepts presented in English and the list of scientific terms found at the beginning of the Arabic chapter is not identical to the list of the terms found at the beginning of the English chapter. However, this is due to the fact that some lessons in the English chapters are not included in the Arabic ones.

- In general all the activities found in the Arabic versions are identical to those found in the English versions. However, there are significant differences between the two versions in the following: 1) some activities in the English versions of the textbooks are not available in the Arabic versions and there are a smaller number of inquiry activities in the Arabic than in the English textbooks, 2) the original English textbook includes “math in science”, “reading in science”, and “I read to review: my animal book” activities which are not included in the translated version. The ‘writing in science – seasons change’ was translated in some cases and placed in the Arabic textbook. However, the scientific method, scientific skills, and safety instructions were added to the Arabic versions of the textbooks. It is worth noting that in the grade 1-4 textbooks most of the inquiry activities, inquiry skill building activities, reading in science, math in science, and careers in science found in the English version are totally missing in the Arabic textbook. Some new



reading in science and math in science were added in the Arabic version to meet the cultural backgrounds of the students. However, all the “I read to review” section was eliminated in the translated version. Finally, the English textbooks include two pages titled “Unit literature” before starting a new unit. Those “Unit literature” were entirely omitted in the Arabic version.

- There are no practice exercises in the Arabic and English versions of the textbooks because these are found in the practice books. Moreover, the learning objectives are available in the teachers’ guides but not in the student textbooks.
- The assessment exercises found in the Arabic version are very similar to those found in the English version. Any differences in the exercises were due to the fact that some of the lessons in the English versions were not included in the chapters of the Arabic versions. One exception is that there are less “Think, Talk, and Write” exercises in the Arabic than in the English versions of the textbooks.
- In general, all the diagrams and illustrations in the Arabic version are exactly the same as the ones found in the English version. In fact, most of the differences in the illustrations are due to culture.



### **Alignment of the Translated Texts to the Philosophy of the Original Textbook**

Evaluation of the Grade 1-6 textbooks showed that there was satisfactory evidence that the content, activities, skills and assessment exercises were aligned with the philosophy of the original textbooks. Another positive pattern with respect to this criterion is the fact that the student has a central role in the teaching and learning process, a feature that is emphasized in the philosophy of the original textbook. However, one of the patterns identified in the evaluations was that there is little evidence that the learning objectives were aligned with the philosophy and these were focused on memorization and did not reflect the higher order thinking. Another pattern was the limited number of links made between the content of the textbooks with topics in math, health and society, a characteristic that was emphasized in the philosophy of the original textbook.

### **Suitability of the Arabic Language to the Educational Level of the Gulf Students**

There was satisfactory evidence that the Arabic language in the Grades 1-6 textbooks was suitable for the educational level of students in terms of diversity of language structures and using concrete examples to illustrate concepts. However, there was almost satisfactory evidence that the length of sentences was appropriate for students because there was a trend of using long sentences especially in Grades 5 and 6.

Additionally, in general there satisfactory evidence that the Arabization of the activities, assessment exercises, content and skills were suitable for the science concepts presented in the textbooks. However, the following negative trends could be identified: a) there were situations where too many concepts were included in the text; b) lack of definitions



of a number of technical terms used in the textbooks and technical terms were not reused in different contexts in the same or subsequent chapters.





### **Suitability of the Arabization to Serve the Science Concepts**

There was satisfactory evidence that the Arabization of the activities, assessment exercises, content and skills in the Grade 1-6 science textbooks was suitable for the science concepts presented in the textbooks with the following exceptions: a) A number of illustrations did not seem to be designed carefully, a situation that might lead students to develop science misconception; b) a number of illustrations in the Arabic textbooks were not aligned with the content of the text content and the absence of illustrations when they were necessary to clarify the concepts; c) the student workbooks are not always divided into chapters that are aligned with the science textbook and no titles are found at the beginning of each lesson in the workbook.

### **Suitability to the Cultural Context of the Gulf States**

There was satisfactory evidence that the illustrations, content, activities, practice exercises, and the skills in the Grade 1-6 science textbooks were suitable to the cultural context of the Gulf States. It is evident that attempts at referring to the Gulf culture were made where pertinent or relevant.

In conclusion the results of analysis indicate that:

6. The translated textbooks were almost satisfactory in aligning the content of the chapters, activities, objectives, practice exercises, assessment exercises, and skills with the stated philosophy of the textbooks.
7. The translated books were almost satisfactory in terms of the suitability of the Arabic language to the educational level of the Gulf students.



8. The translated books were satisfactory in terms of serving the learning of scientific concepts.
9. The translated books were satisfactory in terms of their suitability to the cultural context of the Gulf States.





## Summary and Trends in the Science Textbooks in Grades 7-9

The following pages provide the trends that can be derived from the evaluations of the science textbooks (Grades 7-9). These trends are based on the textbook evaluations and summary reports that are available in Appendices 2.1.7 – 2.1.9 and are presented as function of the criteria included in the evaluation forms which were:

- a) Agreement of the translated Arabic textbook with that of the English textbook,
- b) Alignment of the translated texts to the philosophy of the original textbook,
- c) Suitability of the Arabic language in the translated textbooks to the educational level of the Gulf students,
- d) Suitability of the Arabization of the translated textbooks to serve the science concepts, and
- e) Suitability of the translated textbooks to the cultural context of the Gulf States.

### **Agreement of the translated Arabic Textbooks with the English Textbooks**

The tables of content of each of the original English language textbooks were compared with the translated corresponding textbooks. The comparison shows that in general:

- Some chapters appear in the original English textbook and do not appear in the translated textbook. Moreover, a number of lessons appear in chapters in the English textbooks but not in the Arabic ones. Furthermore, there is no one-one-correspondence between the English and Arabic textbooks because the Arabic version includes chapters from the red, green, and blue versions of the



English textbooks. Finally, the titles of a number of the chapters are not identical in the English and Arabic versions.

Each of the original textbooks was compared with each translated counterpart on definitions and explanations, activities, learning objectives, practice exercises, assessment exercises, and figures and illustrations. The comparison showed the following:

- The definitions and explanations in the translated textbooks were generally similar to those in the original English textbooks. However, the sentences in the translated versions were longer and more complex than those in the original English textbooks (this is important because of the possible association between sentence length and reading difficulty). Additionally, there were some differences due to the fact that the translated textbooks adapted the content to the cultural context of the Gulf States.
- There were differences in the types and cognitive levels of the activities between the translated and the English versions of the textbooks. First, the number of lab activities in the translated textbooks was significantly lower than those in the original English textbooks. Second, the cognitive level of some of the activities in the translated textbooks was lower than those in the original English ones. Third, there is a smaller number of reading activities in the translated textbooks than in the original English ones.
- There are almost no differences between the learning objectives in the English and Arabic versions of the textbooks.



- There were little differences between the practice exercises in the English and Arabic versions of the textbooks. One difference is that there is a practice workbook in Arabic that is not available in English.
- The types of assessment exercises in the Arabic and English versions of the textbooks are similar. However, the number of these exercises is less in the Arabic than in the English versions.
- The differences in the figures and illustrations between the English and Arabic versions of the textbooks are almost always due to the fact that the translated textbooks adapted these figures and illustrations to the cultural context of the Gulf States.

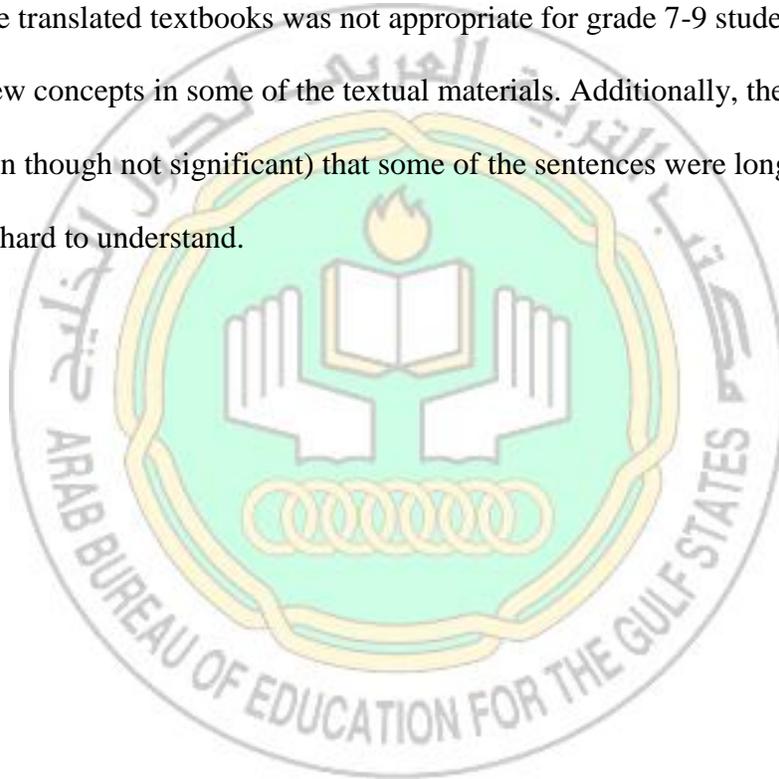
### **Alignment of the Translated Texts to the Philosophy of the Original Textbook**

Evaluation of the science textbooks of Grades 7-9 showed that there was almost satisfactory evidence that the textbook content, activities, practice exercises, and skills were aligned with the philosophy of the original textbooks. Moreover, analysis of the textbooks showed that teachers are provided with various opportunities to enhance student learning by using the variety of activities presented in the teachers' manuals. Alternatively, there is evidence of no alignment between the learning objectives and the philosophy of the original textbooks because these objectives are written at a low cognitive level and focused on content with less attention to science process skills. Finally, there is some evidence that the assessment and revision exercises are not aligned with the philosophy because they are almost closed, limited to the content of the chapters, and represent direct applications of the concepts taught.



### **Suitability of the Arabic Language to the Educational Level of the Gulf Students**

Evaluation of the grade 7 – 9 science textbooks showed that there was satisfactory evidence that the Arabic language was suitable to the educational level of the Gulf States students. In addition, there was no redundancy or presence of unnecessary information. However, there was some evidence that the number of concepts per page in some of the chapters in the translated textbooks was not appropriate for grade 7-9 students; as there were many new concepts in some of the textual materials. Additionally, there was some evidence (even though not significant) that some of the sentences were long and complex making them hard to understand.





### **Suitability of the Arabization to Serve the Science Concepts**

There was satisfactory evidence that the Arabization of the illustrations, activities, skills and assessment exercises were suitable for the science concepts and that these are used to support the learning of science concepts. Moreover, the teachers' guides offer extra guidance for teachers regarding content, activities and projects that enrich the scientific elaboration of the concepts at hand. Finally, the science concepts are supported with figures and illustrations from around the world and those figures are used appropriately to serve the science concepts under study.

### **Suitability to the Cultural Context of the Gulf States**

There was satisfactory evidence that the content, illustrations, activities, and practice exercises in the translated textbooks are culturally appropriate. The textbooks are appropriately aligned with the Gulf States context and include pictures taken from the Gulf culture and from students' everyday life and integrated with the science concepts under study.

In conclusion the results of analysis indicate that:

1. The translated textbooks were almost satisfactory in aligning the content of the chapters, activities, objectives, practice exercises, assessment exercises, and skills with the stated philosophy of the textbooks.
2. The translated textbooks books were satisfactory in terms of the suitability of the Arabic language to the educational level of the Gulf students
3. The translated books were satisfactory in terms of serving the learning of science concepts.



4. The translated books were satisfactory in terms of their suitability to the cultural context of the Gulf States.





## **Summary and Trends in the Biology Textbooks in Grades 10-12**

The following pages provide the trends that can be derived from the evaluations of the biology textbooks (Grades 10-12). These trends are based on the textbook evaluations and summary reports that are available in Appendices 2.3.10 – 2.3.12 and are presented as function of the criteria included in the evaluation forms which were:

- a) Agreement of the translated Arabic textbook with that of the English textbook,
- b) Alignment of the translated texts to the philosophy of the original textbook,
- c) Suitability of the Arabic language in the translated textbooks to the educational level of the Gulf students,
- d) Suitability of the Arabization of the translated textbooks to serve the biology concepts, and
- e) Suitability of the translated textbooks to the cultural context of the Gulf States.

### **Agreement of the translated Arabic Textbooks with the English Textbooks**

The tables of content of each of the original English language textbooks were compared with the translated corresponding textbooks. The comparison shows the following:

- The Arabic version of the table of contents for grade 10, 11, and 12 is relatively aligned with that of the English version. However, there are a few chapters that are omitted in the Arabic version. For instance, Unit 1 “Ecology” which consists of chapters 2, 3, 4 and 5 is completely missing in the Arabic version. Also, Unit 4 “History of Biological Diversity” is almost completely



missing. More specifically chapters 14, 15 and 16 which deal with issues of evolution do not exist in the Arabic versions of the text, only chapter 17 entitled “Organizing Life’s Diversity” is found in the Arabic versions of the textbook. Other missing chapters include chapter 13 “Genetics and Biotechnology” and chapter 31 “Animal Behavior.” In addition there are a number of missing sections from a few chapters. Finally, a number of sections of chapters in the Arabic versions of textbooks contain content from two or more sections of the English versions. This has led to the reduction in the number of minilabs and data analysis labs since each section contains either a “minilab” or “data analysis lab” activity and when two or more lessons are integrated into one, only one of the activities is included in the Arabic version.

Each of the original textbooks was compared with each translated counterpart on definitions and explanations, activities, learning objectives, practice exercises, assessment exercises, and figures and illustrations. The comparison showed the following:

- There were significant differences between the definitions and explanations in the Arabic and English versions of the biology textbooks which included the absence of a number of lessons from the Arabic textbooks especially those that are related to biological evolution and the nature of science. Moreover, there were other sections of chapters that were omitted in the translated textbooks. Finally, the translation of certain terms was not precise. It is noteworthy that the grade 11 and 12 textbooks contained less differences between the Arabic and English versions than in the grade 10 textbooks.



- Most of the activities found in the English version were found in the Arabic version. There were only *a few* activities that were found in the English version but not in the Arabic versions, namely a few minilab and biolab activities.
- The learning objectives in the Arabic version are almost identical to those of the English version.
- The assessment exercises found at the end of each lesson and at the end of the chapters are almost identical in the English and Arabic versions.
- There are no practice exercises in the biology textbooks.
- All the figures and illustrations are the exactly the same in both the English and Arabic versions with the exception of a few pictures which were modified or deleted for cultural purposes

### **Alignment of the Translated Texts to the Philosophy of the Original Textbook**

Evaluation of the biology textbooks of Grades 10-12 showed that there was almost satisfactory evidence that the textbook content, activities, practice and assessment exercises, and skills were aligned with the philosophy of the original textbooks.

Moreover, analysis of the textbooks showed that the role of the teacher in the learning process is portrayed as a guide for student understanding and monitor of student learning; characteristic that are emphasized in the philosophy of the original textbook. In this respect teachers are provided with various assessment opportunities in which they can monitor students' understanding. However, the learning objectives presented in the textbooks and support materials are written at a low cognitive level, providing little evidence for alignment with the philosophy of the original textbook. Finally, it is worth



mentioning that the grade 12 textbooks seems to be completely aligned with the philosophy of the original textbook in terms of encouraging high level thinking skills and relation content to everyday life.

### **Suitability of the Arabic Language to the Educational Level of the Gulf Students**

Evaluation of the biology textbooks showed that there was satisfactory evidence that the Arabic language was suitable to the educational level of students because of its clarity and simplicity. Moreover, sentences used vocabulary of appropriate difficulty and their length was very suitable for secondary level students of various aptitude levels. In addition, there was no redundancy or presence of unnecessary information. However, there was little evidence that the number of concepts per page in some of the chapters was appropriate for secondary students; as there were many new concepts in some of the textual materials. Finally, one negative aspect about the study guide was that scientific terms provided in it was not defined which may cause some problems for students.

### **Suitability of the Arabization to Serve the Biology Concepts**

There was satisfactory evidence that the Arabization of the illustrations, activities, skills and assessment exercises was suitable for the science concepts. Specifically, it is evident that the activities presented in the textbooks and supporting materials encouraged scientific writing and extracting information from texts. While the assessment exercises and activities emphasized application of higher order thinking skills and going beyond the information presented in the text. Finally, the illustrations served their purpose of clarifying the content presented in the text. One negative aspect of the textbooks is absence of connections among the different chapters making it hard to integrate information across topics in biology.



## **Suitability to the Cultural Context of the Gulf States**

There is satisfactory evidence that the content, illustrations, activities, and practice exercises in the translated textbooks are culturally appropriate. However, it is evident that many topics were written culturally neutral even though they could have been made more culturally relevant.

In conclusion the results of analysis indicate that:

1. The translated textbooks were almost satisfactory in aligning the content of the chapters, activities, objectives, practice exercises, assessment exercises, and skills with the stated philosophy of the textbooks.
2. The translated books were satisfactory in terms of the suitability of the Arabic language to the educational level of the Gulf students
3. The translated books were satisfactory in terms of serving the learning of biological concepts and in terms of their suitability to the cultural context of the Gulf States.

## **Summary and Trends in the Chemistry Textbooks in Grades 10-12**

The following pages provide the trends that can be derived from the evaluations of the chemistry textbooks (Grades 10-12). These trends are based on the textbook evaluations and summary reports that are available in Appendices 2.4.10-2.4.12 and are presented as function of the criteria included in the evaluation forms which were:

- a) Agreement of the translated Arabic textbook with that of the English textbook,
- b) Alignment of the translated texts to the philosophy of the original textbook,
- c) Suitability of the Arabic language in the translated textbooks to the educational level of the Gulf students,



- d) Suitability of the Arabization of the translated textbooks to serve the chemistry concepts, and
- e) Suitability of the translated textbooks to the cultural context of the Gulf States.

### **Agreement of the translated Arabic Textbooks with the English Textbooks**

The tables of content of each of the original English language textbooks were compared with the translated corresponding textbooks. The comparison shows the following:

- There are very little differences between the English and Arabic versions of the table of contents of the textbooks. For example, the sequence of chapters is not always the same in both versions of the textbooks. Another example of the differences between the two versions is that there is a smaller number of lessons in some of the chapters thus reducing the amount of content covered.

Each original textbook was compared with each translated counterpart on definitions and explanations, activities, learning objectives, practice exercises, assessment exercises, and figures and illustrations. The comparison showed the following:

- The definitions and explanations in the Arabic and English versions of the textbooks are in general similar with fewer examples from the everyday life of students in the Arabic version especially at the grade 12 level. Moreover, the language of the Arabic version included many complex long sentences in the explanations as compared to shorter and clearer sentences in the English version of the textbooks.



- The activities found in the translated textbook are similar to the ones in the original textbook. The only difference is that there are fewer activities in a number of the chapters in the textbooks.
- The learning objectives are similar in the translated and the original versions of the textbooks.
- The practice exercises found in the translated and the original English textbooks are similar. However, some practice exercises in the original textbook are not found in the translated textbook without any important impact on the quality. On the other hand, there is an additional practice book in the translated textbooks related to each student textbook which is not available in the original versions of the textbooks.
- There are little differences in the assessment exercises between the translated and original versions of the textbook. These differences are mainly due to the fact that some assessment exercises at the end of the chapters in the English textbook are not available in the translated textbook.
- The assessment activities are similar especially the assessment at the end of each lesson. However some assessment exercises, at the end of the chapters, are found in the original English textbook and not found in the translated book (5 out of 56 exercises are missed in one of the chapters). Therefore, the assessments in the translated text book have good agreement with the original book.
- The illustrations and figures in the translated and the original textbooks are different due to the fact that they were changed in the translated textbooks to align them with the cultural context of the Gulf States. However, these figures and



illustrations are effective in explaining the chemical ideas in both versions of the textbooks.

### **Alignment of the Translated Texts to the Philosophy of the Original Textbook**

Evaluation of the chemistry textbooks of Grades 10-12 showed that there was almost satisfactory evidence that the textbook content, activities, practice exercises, and skills were aligned with the philosophy of the original textbooks. The activities seem to be planned to activate students' prior knowledge and emphasize the development of higher order skills and critical thinking. One of the common problems among the textbooks was that the learning objectives were not aligned with the textbook philosophy because they are focused on content and not written at higher cognitive levels. Another common problem was that the assessment and revision exercises at the end of the chapters were almost closed, limited to the content of the chapters and direct applications of the chapters' content.

### **Suitability of the Arabic Language to the Educational Level of the Gulf Students**

Analysis of the chemistry textbooks and supporting materials showed almost satisfactory evidence for the following indicators: (1) length of sentences; (2) reuse of technical terms in subsequent lessons and chapters; (3) clarity of definitions of technical terms; (4) using concrete examples to illustrate concepts and (5) redundancy of terms and sentences with no educational benefit. However, there was little evidence that the number of concepts in some chapters was suitable for grade 10-12 students and there was some evidence that some lessons included complex and sometimes long sentences; situations that might lead to some difficulties for the students.



### **Suitability of the Arabization to serve the chemistry Concepts**

Satisfactory evidence was found to suggest that the 6 criteria associated with the suitability of the Arabization of (1) illustrations; (2) content; (3) activities; (4) practice exercises; (5) assessment exercises and (6) skills to serve the chemistry concepts.

However, there were a few situations where equipment were mentioned without presenting their picture and other situations where a picture could have been used to illustrate abstract concepts in the chapter on atoms and electrons. Finally, one general comment regarding the Arabization was the fact that the Arabic textbooks did not emphasize the interplay between the macro/micro/and symbolic representation systems in chemistry even though research suggests that many problems in chemistry arise from lack of attention to the interplay between these three systems.

### **Suitability to the Cultural Context of the Gulf States**

There is satisfactory evidence that the content, illustrations, activities, and practice exercises in the translated textbooks are culturally appropriate.

In conclusion the results of evaluation indicate that:

1. The translated textbooks were almost satisfactory in aligning the content of the chapters, activities, objectives, practice exercises, assessment exercises, and skills with the stated philosophy of the textbooks.
2. The translated books were satisfactory in terms of the suitability of the Arabic language to the educational level of the Gulf students
3. The translated books were satisfactory in terms of serving the learning of chemical concepts



4. The translated books were satisfactory in terms of their suitability to the cultural context of the Gulf States.





## **Summary and Trends in the Geology Textbooks in Grades 11 and 12**

The following pages provide the trends that can be derived from the evaluations of the geology textbooks in grades 11 and 12. These trends are based on the textbook evaluations and summary reports that are available in Appendices 2.5.11-2.5.12 and are presented as function of the criteria included in the evaluation forms which were:

- a) Agreement of the translated Arabic textbook with that of the English textbook,
- b) Alignment of the translated texts to the philosophy of the original textbook,
- c) Suitability of the Arabic language in the translated textbooks to the educational level of the Gulf students,
- d) Suitability of the Arabization of the translated textbooks to serve the geology concepts, and
- e) Suitability of the translated textbooks to the cultural context of the Gulf States.

### **Agreement of the translated Arabic Textbooks with the English Textbooks**

The tables of content of each of the original English language textbooks were compared with the translated corresponding textbooks. The comparison shows the following:

- The correspondence between the English and Arabic geology textbooks is incomplete and complex because the Arabic geology textbooks include chapters from different levels of the English geology and science textbooks. For example, while 2<sup>nd</sup> Secondary geology lessons are adapted mainly from the Geology English textbooks, the 3<sup>rd</sup> secondary geology lessons are a mix of



lessons from Science (levels green and red) textbooks as well as from the geology English textbooks.

Each of the original textbooks was compared with each translated counterpart on definitions and explanations, activities, learning objectives, practice exercises, assessment exercises, and figures and illustrations. The comparison showed the following:

- The definitions and explanations in the English and Arabic versions of the geology textbooks are relatively similar. The textbooks seem to be translated from the science blue version in addition to the geology textbooks. Moreover, there are no differences between the Arabic and English version of the textbooks in activities, learning objectives, and practice and assessment exercises. Finally, the differences between the figures and illustrations are mainly due to the Arabization process which attempted to make the textbooks more appropriate for the Gulf States Context.

### **Alignment of the Translated Texts to the Philosophy of the Original Textbook**

Evaluation of the geology Grade 11 and 12 textbooks showed that there was satisfactory evidence that the content, activities, skills and assessment exercises were aligned with the philosophy of the original textbooks. However, there is little evidence that the nature of science is sufficiently covered even though it is a component of the textbook philosophy. Additionally, the students' textbook does not include activities related to the scientific method even though these are available in the teachers' manual and can be acquired only if the teacher decides to use them. Finally, there is little evidence that the textbook includes activities specially designed for "independent learners" as the philosophy suggests. Finally, there is little evidence that technology is



integrated in the teaching learning process and that the learning objectives are at high cognitive levels; as a matter of fact many of the learning objectives are at lower levels of Bloom's taxonomy.

### **Suitability of the Arabic Language to the Educational Level of the Gulf Students**

There was satisfactory evidence that the Arabic language in the grade 11 and 12 geology textbooks was suitable for the educational level of students in terms of diversity of language structures, length and complexity of sentences, number of concepts per chapter, reuse of technical terms in subsequent lessons and chapters, clarity of definitions of technical terms, using concrete examples to illustrate concepts, and redundancy of terms and sentences with no educational benefit. Moreover, the geology textbooks are written in a language that seems appealing to students, concepts fully explained, examples of everyday life are presented, and figures, pictures and illustrations serve to further explain the science concepts.

### **Suitability of the Arabization to serve the geology Concepts**

There was satisfactory evidence that the Arabization of the activities, assessment exercises, content and skills in the textbooks was suitable for the geology concepts presented the grade 11 and 12 geology textbooks. However, some practice exercises could have been designed to focus on discovery and inquiry rather than on memory to enhance students' curiosity and interest in geology and consequently results in better comprehension and higher achievement.

### **Suitability to the Cultural Context of the Gulf States**

There was satisfactory evidence that the illustrations, content, activities, practice exercises, and the skills in grade 11 and 12 geology textbooks were suitable to the



cultural context of the Gulf States. Where possible, the authors included pictures and examples of minerals and other related information that are present in the Gulf States making content very relevant to students' everyday life.

In conclusion the results of analysis indicate that:

1. The translated textbooks were almost satisfactory in aligning the content of the chapters, activities, objectives, practice exercises, assessment exercises, and skills with the stated philosophy of the textbooks.
2. The translated books were satisfactory in terms of the suitability of the Arabic language to the educational level of the Gulf students
3. The translated books were satisfactory in terms of serving the learning of geology concepts.
4. The translated books were satisfactory in terms of their suitability to the cultural context of the Gulf States.

## **Summary Report on Physics Textbooks in Grades 10-12**

The following pages provide a summary of the evaluation of the Physics textbooks at each grade separately, followed by a general summary of the results. This summary is based on the textbook evaluations and summary reports that are presented in Appendices 2.6.10-2.6.12 and are organized to address the five criteria included in the evaluation form. These criteria are:

- f) Agreement of the translated textbooks with the English textbooks
- g) Alignment of the translated texts to the philosophy of the original textbook,



- h) Suitability of the Arabic language in the translated textbooks to the educational level of the Gulf students,
- i) Suitability of the Arabization of the translated textbooks to serve the math and science concepts, and
- j) Suitability of the translated textbooks to the cultural context of the Gulf States.

### **Agreement with the English Textbooks**

The *tables of content* of each of the original textbooks were compared with its translated counterpart. The comparison shows that in general:

- In every chapter in the English version, there are sections (mainly activity labs) that are missing from the table of content of the Arabic section. These sections are Launch Lab, Mini Lab, and Physics Lab. Although they appear in the table of content of the English version only these sections are found in the Arabic version of the book as well but not included within the table of content of the Arabic version of the book
- The table of content (*when it comes to lessons*) is completely aligned between the two versions of the book.

The content of each of the original textbooks was compared with each translated counterpart on definitions and explanations, activities, learning objectives, practice exercises, assessment exercises, and figures and illustrations. The comparison showed that:

- The definitions, explanations, activities, learning objectives, practice and assessment exercises in the Arabic version are completely aligned with those in the English version



- Figures and illustrations in the Arabic version of the book are quite different than those in the original book mainly due to cultural considerations. The difference in pictures does not affect meaning at all. The content of each picture is the same (the image delivers the same message in both versions of the book).

### **Alignment with the Philosophy of the Original Textbooks**

- In general, there seems to be little evidence of alignment of the books with the philosophy. Although the content, activities and skills seem to be generally aligned, the main problem is with the learning objectives, the exercises, and assessment tasks which seem not to be aligned with the declared philosophy of the books.
- The objectives are not aligned with the philosophy of the original book and require generally lower order thinking since they rarely go beyond Bloom levels 1 and 2 that include “describing”, “utilizing”, “identifying” and “defining”. Moreover, they only address academic and didactic perspectives of the science concepts with little emphasis on the conceptual nature of physics or how physics is linked with real life and technology (although this link is evident in content through examples, figures and illustrations).
- There is little evidence of the central and active role of the student in the learning process. In rare occasions are students given room to construct their own knowledge in contrast to the philosophy of the book which emphasizes the central role of the student. The exercises are generally application exercises of the mathematical formulas of physics laws and do not target the application to scientific concepts in real life contexts.



- There is a large number of concepts per lesson (and not just per chapter) which may become a burden on the student's cognitive ability.

### **Suitability of the Arabic Language to the Educational Level of the Gulf Students**

The Arabic language used is generally suitable to the educational level of the students. The sentences used seem to be appropriate to the students' scientific levels. The concepts are defined in simple scientific language that is easily understandable (with the teacher's guidance). However, there is a problem with a number of new concepts which are not defined on the assumption that students were exposed to them before, which is not the case in many instances. Moreover, some concepts are used before they are defined. Also, there is an inconsistency in translating technical concepts: some are translated into English while others are not. Moreover, there is a large number of concepts per lesson (and not just chapter) which may become a burden on the student's cognitive ability. Finally, in general there is some lack of clarity in the definitions of some scientific concepts. In such cases the definitions are incomplete, which might lead to misconceptions on the part of students.

### **Suitability to Serve the Learning of Physics Concepts**

In general the Arabization of the textbooks serves the learning of the Physics concepts. However, the definitions of some concepts are very concise and do not serve the scientific purpose. In some other instances, concepts are defined in mathematical terms which may fail to communicate the physical meaning of the concept.

### **Suitability to the Cultural Context of the Gulf States.**

In general, the translated books reflect well the cultural context of the Gulf States Arabia including examples, activities, exercises and illustrations pertaining to the country



and the culture. For example, names of people are suitable within the Gulf culture; however, some activities are not relevant (gymnasts, hockey, ice lakes ...) and may be problematic to students. Furthermore, content, activities, and practice exercises are male-gendered, which again reflects the Gulf culture.

In conclusion the results of analysis indicate that:

1. There is almost complete alignment in the content of the Arabic version with the English version

2. In general, the translated books seem to be almost aligned with the philosophy.

Although the content, activities and skills seem to be generally aligned, the main problem is with the learning objectives, the exercises, and assessment tasks which seem not to be aligned with the declared philosophy of the books.

3. The translated books, except for few instances, were satisfactory in terms of the suitability of the Arabic language to the educational level of the Gulf students

4. The translated books, except for few instances, were satisfactory in terms of serving the learning of mathematical concepts

5. The translated books were satisfactory in terms of their suitability to the cultural context of the Gulf States.