

# A Study of the Concepts of Waste in the Textbooks of Sciences

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## Abstract

This study aims at investigating the inclusion of the concept of waste in the contents of textbooks of sciences of the primary stage for the academic year 2018-2019 via comparative quantitative research methods. As a result, the sciences textbook of the fourth grade of the primary stage has got the first place in devoting attention to the concepts of waste, while the third and fifth grades have got the second place. In conclusion, textbooks of sciences of the primary stage have paid very weak attention to the concepts of waste in comparison with the default ratio.

**Keywords:** Analytical, study, waste, textbooks, sciences.

## *Un estudio de los conceptos de residuos en los libros de texto de ciencias*

### **Resumen**

El objetivo de este estudio es investigar la inclusión del concepto de desperdicio en los contenidos de los libros de texto de ciencias de la etapa primaria para el año académico 2018-2019 mediante métodos de investigación cuantitativa comparativa. Como resultado, el libro de texto de ciencias del cuarto grado de la etapa primaria tiene el primer lugar en dedicar atención a los conceptos de desperdicio, mientras que los grados tercero y quinto tienen el segundo lugar. En conclusión, los libros de texto de ciencias de la etapa primaria han prestado una atención muy débil a los conceptos de desperdicio en comparación con la proporción predeterminada.

**Palabras clave:** analítica, estudio, residuos, libros de texto, ciencias.

### **1. INTRODUCTION**

Waste is an important subject to investigate its considerations from medical and environmental aspects as it has negative effects on the individuals' medical, environmental and social situations. Waste is seen as one of the important problems which have to be taken into consideration since it has a direct effect on the individual and the entire social life. It is also an issue of serious concern to our local governments, which lack sufficient experience in the field of waste management. Also, local government does not have a clear-cut vision

to assess the reality of the environment that is influenced by the housing, commercial or health compounds.

Protection and preservation of the environment and the sustainable development of its resources is a complicated issue that cannot be organized by the environmental regulations and technology procedures only, rather it is an educational issue in the first place. Thus, rules alone cannot achieve the required purpose unless they rely on realization and awareness that reach human conscience to be transformed into values and controls of behavior to protect the environment (Abed, 1994; Aldagheeri, 2007; Taher, 2009; Luo et al, 2018; Somasundram et al., 2019).

## **2. PROCEDURE AND METHODOLOGY OF THE RESEARCH**

- The methodology of research: the researchers employ the analytical descriptive methodology to analyze the textbooks of sciences of the primary stage according to the concept of waste, as it depends on a detailed and accurate description of a phenomenon or specific topic in a frame of digital quality or quantity.

- Study population and the sample: study population is represented by the content of textbooks of sciences of the primary stage in the Republic of Iraq for academic year (2018-2019) after excluding the questions at the end of each chapter, the introduction and the table of contents from the analysis, as shown in table (1) below.

<b>Number of Analyzed pages</b>	<b>Total number of pages</b>	<b>Printing year</b>	<b>Edition</b>	<b>Class</b>	<b>Textbook title</b>	<b>s.</b>
150	200	2016	3	First grade	Sciences	1
155	195	2015	2	Second grade	Sciences	2
79	195	2016	3	Third grade	Sciences	3
84	215	2017	2	Fourth grade	Sciences	4
95	228	2016	1	Fifth grade	Sciences	5
108	252	2017	2	Sixth grade	Sciences	6
671	1285				Total	

Table 1: Shows the number of the analyzed pages of the course the textbooks of sciences of primary stage

### **3. PRESENTING AND INTERPRETING THE RESULTS**

- Sciences Textbook of first grade: the total number of the analyzed pages is (150) after excluding the questions at the end of each chapter, references, and introduction. It appears that the textbook does not achieve any one of the items of waste concepts (household, industrial, agricultural, medical, electronic, pollution).

- Sciences Textbook of second grade: the total number of the analyzed pages is (155) after excluding the questions at the end of each chapter, references, and introduction. It appears that the text textbook

does not achieve any one of the items of waste concepts (household, industrial, agricultural, medical, electronic, pollution).

- Sciences Textbook of third grade: the total number of the analyzed pages is (79) after excluding the questions at the end of each chapter, references, and introduction. Table (2).

Percentages	Repetitions	The concept	S.
100%	2	Household waste	1
-	-	Industrial waste	2
-	-	Agricultural waste	3
-	-	Medical waste	4
-	-	Electronic waste	5
-	-	Pollution	6
100%	2	Total	

Table 2: Repetitions and percentages of waste concepts in the sciences text textbook of third grade

The results reveal that the textbook has got (2) repetitions divided only on the concept of household waste, but it has neglected the (industrial, agricultural, medical, electronic, pollution).

%	Achieved item	%	Repetitions	Item	S.
0%	1	00	2	We should use waste containers and should not littering it.	1
	1	00	2	<b>Total</b>	

Table 3: Repetitions and percentages of the concept of household waste in the sciences textbook of third grade

The results in a table (3) reveal that the item of waste dumping has got (2) repetitions with a ratio of (100%), while the textbook has neglected the other items. The total repetitions in this concept are (2). Hence, the textbook has achieved one item with a ratio of (20%) and

neglected (4) items of the mentioned above concepts. Accordingly, the sciences textbook of third grade has achieved one item of what mentioned in the standard of waste concept with a ratio of (3.33%) and neglected (29) items. Thus, it is a very weak ratio in comparison with the default one which is (40%) that the researchers adopted depending on the expert's views what confirms that the textbook does not draw the student's attention to the concepts of waste in this period of their life (Yang et al., 2019; Soo et al., 2019; Lopes & Oliveira, 2016).

- Sciences textbook of fourth grade: the total number of the analyzed pages is (84) after excluding the questions at the end of each chapter, references, and introduction. Table (6).

Percentages	Repetitions	The concept	S.
50%	2	Household waste	1
25%	1	Industrial waste	2
25%	1	Agricultural waste	3
-	-	Medical waste	4
-	-	Electronic waste	5
-	-	Pollution	6
100%	4	<b>Total</b>	

Table 4: Repetitions and percentages of waste concepts in the sciences textbook of fourth grade

The results reveal that the textbook has got (4) repetitions divided on the concept of household waste, industrial waste, and agricultural waste, but it has neglected the (medical, electronic, pollution). The concept of household waste has got (2) repetitions with a ratio of (50%) while the concepts of industrial and agricultural wastes have got (1) repetition for each with a ratio of (25%). The

textbook has neglected the waste concepts of medical, electronic, pollution.

%	Achieved items	%	Repetitions	Item	S.
40%	2	50	1	Using plastic bags to put household waste to facilitate its transportation outside the residential areas.	1
		50	1	Should instruct people not to throw food remnants with the waste. This may cause bad odors which is inappropriate with the public taste.	2
	1	100	2	<b>Total</b>	

Table 5: Repetitions and percentages of the concept of household waste in the sciences textbook of fourth grade

The results in table (5) show that the item of using plastic bags has got (1) repetition with a ratio of (50%), and the item of instructing people not to throw food remnants with the waste has also got (1) repetition with a ratio of (50%) while the textbook has neglected the other items. The total number of repetitions in this concept is only (2). It appears that the textbook has achieved (2) items with a ratio of (40%) and neglected (4) items of what mentioned in this concept. So, the sciences textbook of fourth grade has achieved (1) item of what stated in the standard of waste concept with a ratio of (6.67%) and neglected (28) items. Therefore, the ratio is very weak in comparison with the default one which is (40%) that the researchers adopted depending on the expert's views what confirms in its turn that the

textbook does not draw the student's attention to the concepts of waste in this period of their life.

%	Achieved items	%	Repetitions	Item	S.
67.16%	1	00	1	Factories fumes cause a raise in the temperature of the earth more than the normal.	1
		00	1	<b>Total</b>	

Table 6: Repetitions and percentages of the concept of industrial waste in the sciences textbook of fourth grade

Table (6) shows that the sciences textbook of fourth grade has achieved only one item (Factories fumes causes a raise of earth temperature more than the normal one) of the items mentioned in the concept of industrial waste. The textbook has got (1) repetition with a ratio of (100%) and neglected the other items. In other words, the textbook has achieved one item with a ratio of (16.67%) and neglected (5) items. The researchers see that this ratio is very weak in comparison with the default one which is (40%) that the researchers adopted depending on the expert's views.

%	Achieved items	%	Repetitions	Item	S.
20%	1	00	1	It is preferred not to use the chemical pesticides excessively as this will pollute soil and water and may cause the death of organisms in the water.	1
		00	1	<b>Total</b>	

Table 7: Repetitions and percentages of the concept of agricultural waste in the sciences textbook of fourth grade





														waste
-		-	-	-	-	-	-	-	-	-	-	-	-	Medical waste
		-	-	-	-	-	-	-	-	-	-	-	-	Electronic waste
-		-	-	-	-	-	-	-	-	-	-	-	-	Pollution
		-	-	-	-	-	-	-	-	-	-	-	-	
100%	8	-	-	5	2	0	4	25	2	-	-	-	-	Total

Table 8: Repetitions and percentages of waste concepts in the sciences textbook of third grade

The results in a table (8) reveal that some items of the waste standard have weakly been achieved in the textbooks of (third, fourth and fifth) primary grades. There are only (8) repetitions with a ratio of (25%) for the textbooks of third and fifth grades, and a ratio of (50%) for the textbook of fourth grade. The topics of the two textbooks included (7) items of what stated in the standard with a ratio of (23.33%). That is to say, these textbooks neglected (23) items; so, this ratio considers very weakly in comparison with the default ratio, which is (40%), that the researchers adopted depending on the expert's views.

#### 4. CONCLUSIONS

In light of the results, the researchers have reached the following conclusions:

- Textbooks of sciences of the primary stage have paid very weak attention to the concepts of waste in comparison with the default ratio, which is (40%), that the researchers adopted depending on the expert's views.

- Sciences textbook of the fourth primary grade has got the first place in paying attention to the concepts of waste, while the textbooks

of third and fifth grades got the second place, but textbooks of sciences of first, second and sixth primary grades do not mention the concepts of waste and this has been discussed by the researchers in the interpretations of the results.

- The concept of household waste has got the first place in the textbooks of sciences of third and fourth primary grades, while the concepts of industrial and agricultural waste have got the second place in the sciences textbook of fourth primary grade, and the first place in the textbook of fifth primary grade. However, the waste concepts of medical, electronic and pollution) have not achieved any ratio in all the analyzed textbooks.

- The item concerned with the use of waste containers has been repeated more than once, so it has got the first place, while other items, such as the item of wastewater treatment, have not got any repetition.

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