

## Analysis of the Content of the Chemistry Book for the Third Intermediate Stage According to Environmental Problems

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### Abstract

The current aim of this study is to know Environmental problems which included in the content of chemistry textbook of intermediate third stage - :To achieve this aim, the researcher organized a listing of environmental issues consisting of (8) major areas, namely (air and air pollution, water pollution, soil pollution, energy, disturbance of biodiversity and environmental balance, waste management foods and medication pollution, mineral wealth investment). Of which (60) sub-issues, then the researcher analyzed the chemistry book for the third intermediate stage for the academic year (2020-2021) in slight of the listing that was prepared, its validity and validity. The consistency of the book became confirmed, and the effects confirmed that the chemistry textbook for the 0.33 grade had a mean of (15) sub-issues, and a percent of ( 25%). In slight of the studies effects, the researcher recommends consisting of the content of the chemistry textbook for the third intermediate stage and the major and minor environmental issues that aren't available, as one of the current developments in medical education.

**Keywords:** Chemistry Book, Environmental Problems

### Research problem

Due to the rapid development of science and technology in various fields, the world today is facing rapid and continuous changes in all areas of life, and there is no doubt that these changes and developments pose significant challenges to education. Education can no longer focus on achievement goals only, which focus in its entirety on Bloom's cognitive classification, and today there is a need to develop educational content, dimensions, trends and life values (such as problem-solving skills) and the ability to make decisions and think effectively through the development of creativity, analytical skills and scientific criticism. . and directing behavior in a positive direction. (Nashwan, 2014: 229), therefore, it has become imperative for the educational system to reconsider the science curricula in general and the chemistry curriculum in particular by including environmental problems in its curricula, given that the goal of the educational process is to prepare a good citizen capable of adapting to himself and his society, and what happens in it In addition to the fact that the content of chemistry curricula for the intermediate stage in Iraq has been recently developed, and since curricula, courses and books address changing issues in multiple aspects, updating, enriching, adapting and developing them from time to time is one of the necessities for developing the curriculum. In addition to the researchers' review of previous studies at the local level (as far as the researchers know), he did not find a study that dealt with analyzing the content of the chemistry book for the third intermediate grade according to environmental problems, and through the researcher's experience in teaching chemistry (11 years), the researcher felt that the book was free of environmental problems, so He had the desire to analyze the content of the chemistry book for the third intermediate grade to identify the extent to which it includes environmental problems, so the research problem was to answer the following question: -

**What are the environmental problems included in the chemistry book for the third intermediate grade?**

**The importance of the study:**

Through the relationship between education and the environment, we found that human beings are mainly responsible for protecting and preserving the environment, because people's wrong behaviors on the environment cause these environmental problems, so it is necessary to apply laws and legislation to ensure the protection of the environment, as the law alone cannot achieve the desired purpose in This field, if it is not based on a complete understanding and realization of human conscience and transforming it into an awareness of positive social values, and the basis for that is people's awareness of the environment and their awareness of protection and the importance of the environment. (Al-Jabri, 2020: 66).

In recent years, the importance of environmental education has emerged to educate learners to complete the ecosystem of natural resources needed for development projects, and to provide learners with knowledge of the environmental systems and conditions surrounding their early life. Many researchers in this field pointed out that there are three ways to protect and preserve the environment (science, law and education), and they emphasized that education plays a more influential role in protecting the environment than the role of science and law. This is because education formulates and establishes the personalities of individuals and restores their behavior to accept the law, apply it and implement its texts (Al-Saud, 2007: 13), and the researchers believe that there is a need to clarify the concept of environmental problems and indicate their results, which have become one of the urgent problems because they affect the survival of living organisms and disrupt the ecological system of the environment. And thus negatively affect human life, as environmental problems such as air and atmosphere pollution, water pollution, soil pollution, energy problems and others have become a priority of human interest, as these problems threaten the human race and even all living organisms with the demise, so it has become an undeniable reality because everyone in the world In general and in the Third World in particular, it is experienced by it, but suffers from its effects and woes, due to neglect and lack of environmental awareness, which has caused disruption and deterioration in the elements of the environment and its various components. Therefore, environmental problems have become a tragedy that includes the world in different proportions, and today it threatens human existence and threatens to ring alarm bells in all A place because the air is polluted, the food is polluted, and the water is polluted. Moreover, one of the biggest threats to the world and its health is chemical pollution, in the past sixty years, More than 75,000 thousand chemicals have been produced and introduced into our environment, our air, our water, our food, our tools, and everything we come in contact with every day. And many of them have dangerous effects on our bodies and our mental and emotional health. (Abdullah, 2010: 117) In Iraq, the Arab Teachers Conference was held in 1974, and in its recommendations, it pointed to emphasizing the field activities through which the student gropes for the potential of the Iraqi and Arab environment and how to preserve them. Concerning education in its various stages, working to introduce materials and environmental sciences in all academic levels and working to establish and develop institutes specialized in environmental sciences to graduate qualified cadres for environmental work (Ministry of Environment, 359: 2009).

**Based on the foregoing, the importance of the study emerges as follows:**

- 1- The first attempt in Iraq, to the knowledge of the two researchers, deals with the analysis of the chemistry book for the third intermediate grade according to environmental problems.
- 2- This study is a message that the researcher sends to those responsible for the educational process, to provide students and raise awareness of some environmental problems.
- 3- The results of the study may provide a clear picture of the environmental problems that society suffers from, which chemistry books should address or include because of their benefit to the student and society.

**Objectives Of The Research**

The current research aims to find out:-

- Environmental problems included in the chemistry book for the third intermediate grade?

**Limitation Of The Research**

The current search was limited to:

- 1- **Objective limits:** - Chemistry book for the intermediate stage.

- 2- **Time limits:** - the academic year 2020-2021 AD
- 3- **Normative limits:**- The research was limited to environmental problems (air and atmosphere pollution, water pollution, soil pollution, energy, disruption of biodiversity and environmental balance, waste management, food and drug pollution, mineral wealth investment)

### Definition Of The Terms

- 1- **Content analysis:** It was defined by (Al-Hashimi and Attia 2011): as “a method of scientific research that falls under descriptive research and its purpose is to know the characteristics of communication material or textbooks and describe these characteristics as a quantitative description expressed in quantitative symbols in addition to the results obtained by methods Others are indicators that determine the direction of development required.

#### *The definition of the researcher operationally:*

It is the method that aims to deconstruct, analyze and interpret the content of the chemistry book for the third intermediate grade in an objective and quantitative manner according to the standard of environmental problems issues and it is measured by the questionnaire prepared for this purpose.

- 2- **Environmental problems,** defined by (Al-Ta’i and Muhsin, 2010: 31-32) as: “a disturbance in the natural balance of ecosystems and resulting in a change in one or more of the physical or chemical properties of all or some of the components of the biosphere, and this change often leads to the occurrence of adverse effects on the health of living organisms. (Al-Ta’i and Muhsin, 2010: 31-32)

#### *The researcher defines environmental problems operationally:*

It is the set of issues that cause harm to our environment and cause negative change in it, such as (air pollution, water pollution, soil pollution, energy, waste management, and mineral wealth investment) and the extent to which they are included in the content of the chemistry book for the third intermediate grade according to the items of the environmental problems standard prepared for this purpose.

### Theoretical Background

#### **The concept of environmental problems:**

Today's society faces many environmental problems, such as air, water and soil pollution, food and medicine pollution, etc., partly due to human error and unconscious behavior. Environmental problems vary according to the bases and criteria that were adopted in determining the nature of their emergence and the factors that led to their formation and spatial dimensions. Within this scope, the environmental problem was defined as “an imbalance in the balance of the ecosystem, and this imbalance occurs when one or more components of the ecosystem are affected, so the rest of the components are affected and the rest of the relationships existing between them change, so the system becomes unable to maintain its previous balance.” (Al-Saud, 1997: 214)

Saffarini and Al-Abed mentioned the causes of environmental problems in general in a group of overlapping factors that combine development in the field of industry, population increase, and then environmental imbalance, due to the misuse of available resources, and they embodied in their entirety the concept of environmental problems, and for this there are a set of reasons which led to the emergence of these problems, which are the following:

- 1- Limited wealth and population increase.
- 2- Depletion of mineral resources and the resulting pollution through extraction and treatment processes
- 3- The production of a huge amount of waste that is difficult to dispose of, which caused the pollution of surface and ground water
- 4- Producing a huge amount of dangerous chemical compounds that are unparalleled in nature and that do not decompose easily, thus leading to their entry into the food chain.

- 5- Excessive use of toxic substances on a large scale and an increase in the possibility of accidents harmful to the environment such as: spillage of harmful chemicals, oil, radioactive materials and heavy metals.
- 6- Poor planning in implementing projects and not evaluating the environmental impacts resulting from their establishment. (Saffarini and Abed, 2002: 22)

Researchers believe that the Iraqi environment is not far from what is happening in the global environment, and in particular environmental problems because of their economic, political and health problems, and today we often find or face environmental problems in our daily lives. For example, climate change, global warming, water pollution, random construction and use of agricultural land for housing construction, establishment of informal enterprises, expansion of workshops, lack of parks and green spaces between regions, acceleration of various activities, including industrial phenomena. In the areas of growth, technology and agriculture as well as urbanization, construction and expansion, the positive aspects of moving in different directions and the negative effects of these activities are evident in the areas of environmental pollution and factory waste. Untreated and unplanned disposal and the wrong use of pesticides, fertilizers, and chemicals (such as plastic) in agriculture can increase negative impacts and may lead to water and soil pollution. Through the above, we find that man has clearly intervened in the various environmental systems, causing a major imbalance in their natural balance. In addition, man is a complement to the elements of the environment, but his wrong and irresponsible practices had a significant impact on the emergence of environmental problems that threaten his present and future. The researcher will present some of these problems.

**First: Air pollution:**

Air pollution is one of the most prevalent environmental problems known to man. In forests and others, air pollution is defined as “the presence of impurities in the air, whether caused by natural or human factors, in quantities and for periods sufficient to disturb its comfort or to harm public health or human life, animal, plant and property, or sufficient to interfere with comfortable and appropriate enjoyment.” for life”. (Al-Sharnoubi, 1998: 182)

**Second: water pollution**

All types of water are affected by the process of pollution, but because the freshwater ecosystem is in direct contact with the daily activities of humans, and the amount is small compared to other water systems, it is undoubtedly more susceptible to pollution. As for the marine environment, it is not far from pollution, but due to its huge size and its distance from the center of human activities, the degree of pollution in it is relatively low.

Water pollution is defined as “the events of disruption and damage to the water ecosystem, so that the water becomes unfit for drinking, for its basic uses, and is unable to contain particles, microorganisms and various wastes in its ecosystem” (Rabee, 2009: 42).

**Third: Soil Pollution:**

Soil consists of four main elements: water, air, minerals and organic matter, and it is arranged in a complex physical and chemical system, so soil has a solid foundation for stabilizing plants and providing them with water and essential elements. Plants get all the essential elements needed for growth from the roots, and absorb them from soil particles, soil is also home to many different microorganisms (such as bacteria) and some animal species such as worms and insect species.

Soil pollution is defined as “a change in the properties and characteristics of the soil as a result of the entry of foreign substances in certain concentrations, and this is accompanied by direct or indirect damage to everything that is in the soil” (Al-Saadani and Ouda, 2007: 60).

**Fourth: Energy:**

Throughout history, humans have discovered a variety of ways to harness and use natural energy, for example, using fire to obtain heat and cooking, and taming animals about five thousand years ago to supplement human muscle strength. The purpose of this is cultivation of land and transportation. We discovered that it wasn't until after the Industrial Revolution that machines came into widespread use, as machines replaced human, agricultural, and manufacturing jobs. It can exist in a variety of kinetic, thermal, electrical, chemical, nuclear or other forms. (Encyclopedia Britannica, 2019).

**Fifth: Disruption of biodiversity and ecological balance:**

The environmental imbalance may be the result of changes in some natural conditions (for example, heat and rain), or it may be caused by changes in some important conditions, which affect the relationship between living organisms that live in The environment, and the impact of each other, and the disruption also occurs as a result of the mutual influence of humans directly interfering with the components of the environment in one way or another, just as the introduction of new organisms into a stable environment, such as what happened in the Hawaiian Islands in the Pacific Ocean, rabbits are moved there, which It leads to their reproduction in huge numbers, which provides them with suitable conditions, thus increasing their numbers, which exceeded the rate of devouring herbs and plants, the growth rate of these plants, then the food decreased, and most of these rabbits died along with some other creatures (Al-Tantawi, 2012: 55), for example in Iraq The area of land covered by trees has decreased, due to the successive authorities' neglect of this sector. Northern Iraq has been damaged due to random cutting. The number of palm trees has also decreased from about 30 million palm trees to 12 million palm trees due to the wars. r water, agricultural diseases, and neglect; Therefore, the deterioration of the vegetation cover has become an important factor in the deterioration of the environment, its imbalance and its tendency towards drought.

**Sixth: Waste Management:**

Due to the economic and social development in recent years, new lifestyles have emerged. These new lifestyles have encouraged an increase and diversification of human needs, which has led to an increase in the quantity and diversity of waste generated daily, which is urgently necessary to follow a scientific approach to managing this waste whether it is collected, stored, transported and disposed of in an appropriate manner. (Al-Hassan, 2010: 235)

**Seventh: Food and drug contamination:**

There is no doubt that food contamination can be considered one of the most important problems that people suffer from in this age, for with every step the world takes, people feel healthy and their lives progress, but then he finds that that step, as a reason for progress, is also the cause of suffering, which is caused by man in Greedy origin to improve the quality of its food and increase its quantity, and pollution can occur in many different ways, the first and most important of which is the use of preservatives or the use of materials containing excessive heavy metals, but there are other ways such as fungal poisoning. For example. (Al-Dulaimi, 2019: 109)

As for medicine, it is any chemical compound that people consume for the purpose of preventing or treating certain diseases or for what is called pleasure, and there are many sources of medicinal pollution, including those that are used to kill antibiotics for dead microorganisms. However, many of them have negative effects, as well as drug interactions and side effects of drug abuse that may interfere with each other and negatively affect human health, in addition to that they also include poisoning substances including smoking, hallucinations, alcohol and drugs. (Pumice, 2014: 58)

**Eighth: Investing mineral wealth:**

Minerals are a natural substance with a prominent or variable chemical composition in a limited range and has a stable internal crystal structure. By definition, it is noted that a mineral is a substance present in nature and not a human, animal or plant enters into its composition, and that the chemical composition is not sufficient to determine the mineral, so from It is necessary to know the crystal structure that controls many natural types of minerals such as hardness, specific gravity and color, and mining is the process of extracting minerals from the ground. (Abdul-Wahhab, 2001: 17) In light of the above, the researchers believe that it is necessary to protect natural resources from Enforcement through rational use of minerals, because they are bounties and gifts given by God Almighty to humanity to be his successor on earth, and they are present in nature in varying proportions without human intervention, and it is possible to invest in a way that achieves economic development while maintaining ecological balance without disturbing the environment.

**Research Methodology and Procedures:****First: Research Methodology**

The researcher adopted the descriptive analytical method in this research, to analyze the content of the chemistry book for the third intermediate grade according to environmental problems, and one of its functions is to describe the results, analyze and interpret them in clear and specific terms.

### Second: - Research procedures:

The search procedures included identifying the following:

#### 1- Research Community and Sample

1 a - **The research community:** The community of this research was identified in the book of chemistry for the third intermediate grade in the Republic of Iraq for the academic year 2020-2021, Table (1), as defining the research community is one of the methodological steps in educational research, and it requires extreme accuracy as the research procedures and design depend on it and efficiency of its results.

Table (1)

No.	The title of the book	edition	year of publication	Total number of pages	Number of pages analyst	Number of pages excluded	Number of chapters
1	Chemistry Book for the Third Intermediate Stage	Ninth	2019	152	111	41	9

It is clear from Table (1) that the number of analyzed pages is (111) pages after the researcher excluded the main title, introductions, chapter titles, performance indicators, chapter questions, and indexes, because these aspects do not represent scientific content directly related to the aim of the research, or because of the difficulty of segmenting some of them. The other leads to specific and clear ideas, as well as being a familiar procedure in studies that dealt with content analysis.

1 b - **The research sample:** The researcher took the chemistry book for the third intermediate grade as a sample for the purpose of the research, which is the research community itself.

#### 2. Research Tool

- 1- Content analysis requires the existence of an analysis tool that analyzes the content of the chemistry book for the third intermediate grade.
- 2- For the purpose of verifying the goal of the research, the researcher prepared a list of environmental problems that must be available in the content of the chemistry book for the third intermediate grade, and its preparation went through the following stages:

Reviewing some studies related to environmental problems.

- Access to books and literature that dealt with the topics of environmental problems.

Reviewing experts and specialists in the field of educational sciences, curricula and teaching methods

In light of the foregoing, a list of environmental problems was reached in its initial form and consisted of (8) main areas that included (60) items distributed over the fields respectively, namely: (air and atmosphere pollution, water pollution, soil pollution, energy, disruption of biodiversity and balance Environmental, waste management, food and drug pollution, investment of mineral resources)

#### 3. Validity Tool

Validity here means the extent to which the measurement tool is able to measure the property that was designed to measure it. (An-Na'ma and Sabah, 2004: 241)

The validity of the tool was assessed as the tool was presented in its initial form to a group of experts and specialists in (chemistry teaching, curricula, environment, teaching methods, educational psychology, and some supervisors specializing in chemistry), in order to ensure the apparent validity of the tool and the arbitrators expressed Their observations about the tool and the researcher took it

#### Analysis steps:

The researchers followed a number of steps in the process of analyzing the content of the chemistry book for the third intermediate grade according to environmental problems, and they can be summarized as follows:

- 1- Read the topic, the content of the chemistry textbook for the third intermediate grade in general and comprehensively, in order to crystallize the idea in the mind of the analyst, on the basis of which he can identify ideas that include environmental problems.
- 2- Read carefully what each page contains, identifying the idea and writing it in forms in order to record its repetitions.
- 3- Determine the type of idea, explicit or implicit.
- 4- Emptying the results of the repetitions in the analysis tables by giving one repetition for each idea, and converting them into ratios to be interpreted later. (Al-Tamimi, 2011: 277-278)

#### **The application of the analysis process:**

The researcher analyzed a random sample of the content and identified the sentences and phrases that carry ideas, represented in the eighth chapter (sulfur) of the chemistry book for the third intermediate grade (12 pages), expressing them and then classifying the ideas according to the fields of classification adopted in the tool.

#### **Verify the validity of the analysis process:**

It is "the validity of the measurement method that the researcher uses to measure the content phenomena that are intended to be measured and to provide the required information in the light of the objectives of the analysis" (Al-Hashimi and Mohsen, 2009, 191)

After completing the analysis done by the researcher, a sample of the analyzed material was presented to a number of arbitrators and specialists in teaching chemistry, curricula and teaching methods, with an explanation of how to extract the idea and categorize it within its fields according to the environmental problems that the researcher put in its final form in the analyzed scientific article to ensure the validity of its analysis.

#### **Analyzer stability:**

The stability of the results of the analysis if the analysis is re-applied and under the same conditions, even if the analyst and the time differed, is the stability of the analysis. (The Tiger, 2008: 76)

Stability in content analysis is affected by the analyst's experience, his skills in analysis, the clarity of the data to be analyzed, and aspects of classification. (Kerilnger,1975,129)

In order for the stability to be more objective and to obtain acceptable stability. The researcher used two methods to calculate the stability.

#### **1- Agreement over time:**

In other words, the analyst or a group of analysts reached the same results through the researcher himself re-analyzing after a period of time and comparing the results of the first and second analysis and ensuring the extent of compatibility and consistency between the analysis of the same topic in varying periods of time.

Therefore, the researcher (118: Holisti, 1969) re-analyzed the content of the chemistry book for the third average adhesive according to the environmental problems after (30) days have passed from its first analysis, and the value of the stability coefficient calculated using the Holisti equation was (98%), which is a high percentage.

#### **2 - The agreement between the analysts:**

Here the researcher chooses the analysts who analyze the topic independently (each separately) and compares the results between the analysts as well as with the results reached by the researcher. (Al-Tamimi, 2011: 278), and it is not required that the representative sample be very large, but rather it is determined by the researcher in relation to the objective and nature of the research and the analyzed content. That is, it consists of a few hundred (500-1000), and this percentage decreases until it becomes (5%) in very large societies. (Odeh and Khalil, 1988: 177-178)

#### **Statistical means:**

1 - Holstey's equation: to calculate the stability coefficient of the analysis.

$$R = \frac{2(C1, 2)}{C1 + C2}$$

2 - Percentage: as an arithmetic method for calculating frequencies

### Presentation and interpretation of results

The researcher used the analysis tool that was prepared to analyze the content of the chemistry book for the third intermediate grade to identify the environmental problems it contains, and in light of the analysis carried out by the researcher presents the results of the analysis in detail as follows:

#### Chemistry book for the third intermediate grade:

The number of pages analyzed by the researcher from the chemistry book for the third intermediate grade amounted to (111) pages after excluding (the book's introduction, chapter titles and performance indicators, questions at the end of each chapter as well as indexes and sources), and table (2) shows that:

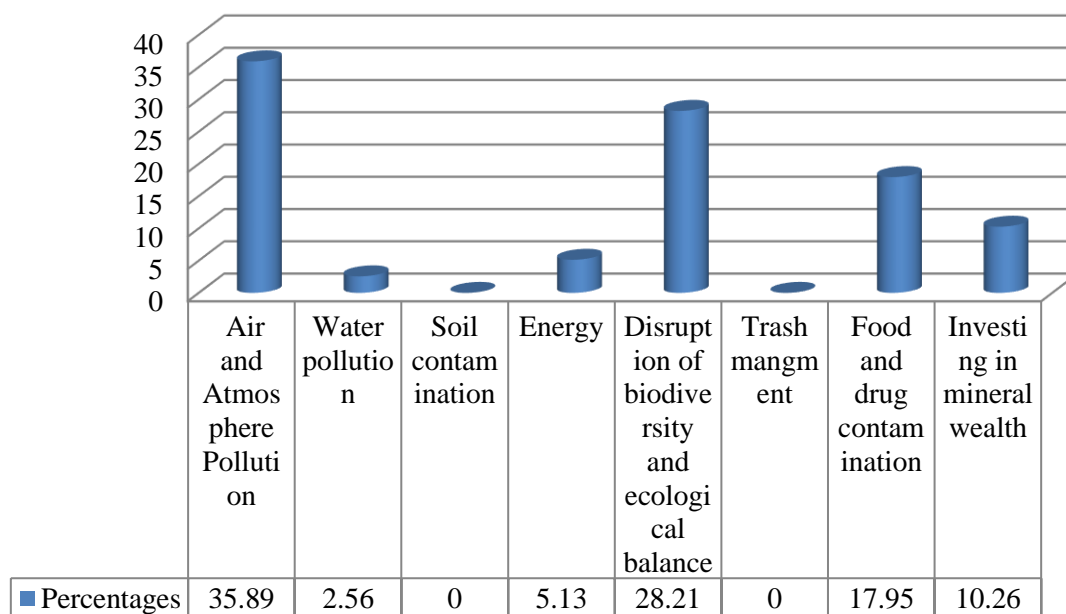
No.	The main environmental problems	repetitions	Percentages%
1	Air and Atmosphere Pollution	14	35.89
2	Water pollution	1	2.56
3	Soil contamination	-	-
4	Energy	2	5.13
5	Disruption of biodiversity and ecological balance	11	28.21
6	Trash mangment	-	-
7	Food and drug contamination	7	17.95
8	Investing in mineral wealth	4	10.26
<b>Total</b>		39	%100

Table (2) shows that the number of iterations obtained by the book is (39), distributed over (6) main areas, as attention is focused on the field (air and atmospheric pollution) at a rate of (14) and at a rate of (35.89%), followed by the field of ( Violation of biodiversity and ecological balance) (11) recurring (28.21%), then the field of (food and medicinal pollution) when it got (7) recurring (17.95%), and the field (investment of mineral wealth) got ( 4) Repetitions (10.26%), while the field (energy) got two repetitions for each (5.13%), and the field (water pollution) got one recurrence, and the rate of (2.56%), while the book neglected two main areas of environmental problems, namely (pollution Soil), (waste management), and its percentage was zero, meaning that it did not get any repetition, and through these results, we find that the content of the chemistry book for the third intermediate grade did not address the areas of environmental problems in a way that suits the size of these areas and their importance at the global, regional and local levels, but rather dealt with Some areas are unorganized and unplanned and neglected other areas, and the researcher believes that the reason for this is due to the fact that the content of the book b Focused mainly on the topics (atomic structure of matter, classification of the periodic table and knowledge of the general characteristics of the elements of groups, and the characteristics and importance of organic compounds), and the content of the book did not include some examples and educational activities that illustrate environmental problems resulting from the interaction between science, technology and society, which in turn helps to develop The ability of learners to take appropriate decisions towards these environmental problems.

Figure (1) shows the percentages of environmental problem areas in the chemistry book for the third intermediate grade.



### Percentage of environmental problem areas in the chemistry textbook for the third intermediate grade



#### Recommendation

In light of the research results, the researcher recommends the following:

- 1- Involving those interested in environmental education and specialists in the field of environment within the committees for preparing science curricula in general and chemistry curriculum in particular.
- 2- Inclusion in the chemistry book for the third intermediate grade of the main and sub-disciplines of unavailable environmental problems
- 3- Benefiting from contemporary global efforts to integrate and include environmental problems in the content of chemistry books or design programs related to these problems.

#### Suggestions:

To complement the current research, the researcher proposes conducting an analytical study of the content of chemistry books in other academic levels, and analyzing the content of other scientific subjects books such as physics and biology and science books for the preparatory stage according to environmental problems.

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