Analysis of the Science Book for Second Year of Preparatory School Students, First and Second Semesters.

(Action Research)

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Abstract:
The present study aimed at analysing the content of the second preparatory science book in Egypt focusing on its topics, objectives, organization, method, and effectiveness in achieving scientific objectives. The researchers designed a content analysis checklist in the light of achieving the curricula objectives, and its sample were from the science book for the second intermediate grade approved by the Egyptian Ministry of Education for the academic year 2022/2023. To determine the validity of achieving the research goals, we conducted a questionnaire for a random sample of students. The results showed that the science book in the second year preparatory stage covered the objectives of the first unit in the first semester with a ratio 83.33%, and the last unit in the second semester with ratio 80.4%.

Key Words:
Content analysis; Science textbook; Questionnaire.

1. Introduction:
Today, the world is witnessing rapid and successive changes in various areas of life, which requires educational institutions at all levels to prepare citizens who are able to keep pace with the changes. The enormous quantitative and qualitative change in human knowledge in various fields of life has imposed a great challenge on educators in order to strive to develop science curricula in
keeping with these changes, which has made reconsidering, analysing and evaluating science curricula from time to time an imperative to determine the effectiveness of these curricula. Science curricula are of particular importance as they bear the greatest burden in achieving a wide range of educational goals, including teaching the learner a scientific culture, linking him to the world in which he lives, to his environment, and to his daily life and interests, so that he can feel the value of what he has learned. Therefore, science curricula are among the most important in need of revision and development. (Morris, 2015, 2708–2720).

The textbook is an essential tool in the educational process, as it constitutes the main source of information and knowledge for students. (DiGisi, 1995, 123–142)

Our aim is to analyze the school textbook to identify its strengths and weaknesses and assess its suitability for conveying information to students. We have taken the book into consideration for our study, and we have selected the first unit of the first semester, which was chemistry and the second unit in the second semester, which was under the title of Biology.

Analysis of the school textbook is carried out in four sections:

1. Does the scientific content achieve the desired objectives of the lesson? (The objectives of the lesson, the way it is written, and the means of achieving it within the subject matter of the lesson).

2. Does the scientific content of the lesson contain precise and clear scientific concepts? State your comment? (The scientific terms present in the lesson, the way they are written, and the means of matching them to the student's intellectual level to deliver the information).

3. Does the scientific content of the lesson include applications in life? (The life applications in the lesson, and the bridge between the scientific content of the book and the student's practical life to ensure the retention of the information).

4. Choose a part of the lesson and rephrase it in your own style to suit the topic of the lesson and the age group? (A difficult part of the lesson is selected, and it is rewritten in an easier way to ensure the same amount of information is conveyed to the student). By achieving these sections in every lesson, we ensure a complete analysis of the lessons, which, if successful, will guarantee the delivery of all information to the students.

2. Theoretical framework:

In this section, we will analyse the first unit in the first semester and the last unit in the second semester of the science textbook according to the above four questions.

Science textbook:

It is defined in the current study as a group of books that are prepared and produced under the supervision of the Ministry of Education in Egypt, and the Ministry requires all government and experimental schools to carry out the education process through these books and in light of the various topics they contain and contain. (Alayashrah, 2017, 68–82)
Content analysis:
It is known in the current study as the systematic quantitative description of the objectives and concepts included in the science textbook for the second grade of middle school. (Rahima, 2021, 2834–2847)

2.1 Analysis of the first unit in the first semester: (Chemistry)

Lesson 1:
1. Does the scientific content achieve the desired objectives of the lesson?
   - Objective 1: Recognize the effort of some scientists to classify elements.
     - Yes, the objective has been achieved, for
   - Objective 2: Recognize the principles of elements classification in the modern periodic table:
     - Yes, the objective has been achieved, for
   - Objective 3: Determine the location of some elements in the modern periodic table by recognize Their atomic numbers.
     - Yes, the objective has been achieved, for
   - Objective 4: Deduce the atomic numbers of some elements by recognize Their locations in the modern periodic table.
     - Yes, the objective has been achieved, for
   - Objective 5: Estimate the importance of discipline and organization in our life.
     - Yes, the objective has been achieved, for
   - Objective 6: Estimate scientist’s efforts in discovering, classifying, and investing elements.
     - No, the objective hasn't been achieved.

2. Does the scientific content of the lesson contain precise and clear scientific concepts? State your comment?
A lesson attempt on element classification likely refers to studying the historical development of the periodic table, which is the organizational chart for all the known elements. Here's a breakdown of the key terms:

- Mendeleev: Periodic table
- Atomic numbers
- Electronic configuration
- Energy levels
- Number of period
- Number of electrons in outermost energy level
- Number of group
Element: A fundamental building block of matter, characterized by its unique number of protons.
Classification: Grouping things together based on shared properties.
Periodic Table: A chart that organizes elements based on their atomic number (number of protons) and recurring patterns in their chemical and physical properties.

The Modern Periodic Table: Developed by Dmitri Mendeleev, this table arranges elements in rows (periods) and columns (groups) based on atomic numbers. It not only organizes existing elements but also predicts the existence of elements not yet discovered.

3. Does the scientific content of the lesson include applications in life?
- Calculating the density of materials helped us detect commercial fraud, since by knowing the density of the real material, if there is any change in it, this indicates commercial fraud. Also, after scientists studied the properties of materials, they made cooking utensils from aluminium due to its high degree of hardness. Because it is a good conductor of heat, they also smelted metals to shape them and make alloys such as gold and copper alloy, and with the continued study of the properties of materials, we were able to separate the components of crude petroleum oil from each other by heating...and we were also able
- There are also chemical properties that, after studying them, enabled us to protect metals from corrosion or corrosion by coating them and covering them with insulating materials such as paint and grease, or coating them with materials with weak chemical activity, which are materials that do not interact with atmospheric oxygen and do not rust.

4. Choose a part of the lesson and rephrase it in your own style to suit the topic of the lesson and the age group?

The modern periodic table consists of 7 periods and 18 groups, and it consists of four main blocks (s, p, d, f). It contains 118 elements, 92 of which are found in the Earth’s crust, and the rest are chemically synthesized in the laboratory, and the elements in it are classified according to the atomic number, as this is what determines the period and group number, and thus the block in it.

Lesson 2:
1. Does the scientific content achieve the desired objectives of the lesson?
Objective 1: Atomic size property.
- Yes, the objective has been achieved, for
Objective 2: The electronegativity property:
- Yes, the objective has been achieved, for

Objective 3: Metallic and non-metallic property:
- Yes, the objective has been achieved, for

Objective 4: Compare some elements according to the electronic configuration and the chemical activity.
- When the teacher explains the lesson, the student will be able to compare them.

Objective 5: Identify metals, non-metals, and metalloids.
- Yes, the objective has been achieved, for

Objective 6: Identify the behaviour of some metals of the chemical activity series with water.
- Yes, the objective has been achieved, for

Objective 7: Use tools and substances to discover the chemical properties of metals and non-metals.
- Yes, the objective has been achieved, for

2. Does the scientific content of the lesson contain precise and clear scientific concepts? State your comment?

The graduation of elements' properties in the modern periodic table refers to the systematic changes in the properties of elements as you move across a period (row) or down a group (column) of the table. These changes are due to the increasing atomic number (number of protons) of the elements.
Here's a breakdown of how some key properties graduate (change) within the periodic table:

**Atomic Size:**
- Decreases moving across a period (left to right) due to increasing nuclear charge (more protons) pulling the electrons closer to the nucleus.
- Increases moving down a group (top to bottom) because of the addition of new electron shells.

**Electronegativity:**
- Generally, increases moving across a period (left to right) because the effective nuclear charge increases, making it harder for the outermost electrons to be shared with other atoms.
- Decreases moving down a group (top to bottom) because the valence electrons are further away from the nucleus and experience less attraction.

**Metallic Character:**
- Decreases moving across a period (left to right). Metals are on the left side of the table and tend to lose electrons to form cations (positively charged ions). As you move right, the elements become less willing to lose electrons and more likely to gain electrons to form anions (negatively charged ions), taking on non-metallic character.
- Increases moving down a group (top to bottom). This is because the additional electron shells shield the valence electrons from the nucleus, making them more likely to be lost and exhibit metallic character.
- Understanding these trends is crucial in predicting the behaviour of elements and their tendency to form certain types of bonds.

3. Does the scientific content of the lesson include applications in life?
- Yes, the lesson includes applications in life like Cleaning silver tools.
- Cleaning silver tools Cover the bottom of a plastic plate with an aluminium paper (foil), whereas the bright surface is upward. – Put on the aluminium paper the silver tools which you want to clean. Cover them with enough boiling water and then put (3) spoons of baking powder. – Leave the tools for 15 minutes while stirring. – Dry the tools after rinsing them with hot water.

The chemical properties of nonmental:
Glittering silver plate to know the chemical properties of nonmetal elements.
Participate with your classmates under the supervision of your teacher to do the following activity.

4. Choose a part of the lesson and rephrase it in your own style to suit the topic of the lesson and the age group?
- Define metallic and non-metallic character:
  Solution Metallic character: The metallic character is the tendency of an element to lose electrons and form positive ions or cations. Alkali metals, like lithium (Li) sodium (Na), and potassium (K) are the most electropositive elements.
Caesium (Ca) is the most electropositive element as well as stable. Metallic character decreases from left to right across the periods.

Metallic character increases down the group.

Non–metallic character: The non–metallic character is the tendency of an element to accept electrons and form negative ions or anions.

Fluorine is the most electronegative element.

Non–metallic character of elements increases from left to right across the period and decreases from top to bottom.

Lesson 3:

1. Does the scientific content achieve the desired objectives of the lesson?

Objective 1: Determine the valency of alkali metals.
- Yes, the objective has been achieved.
- They are mono–valent elements because their outermost shells contain \(1\) electron.

Objective 2: Describe the behaviours of alkali elements in the chemical reactions.
- Yes, the objective has been achieved, for

Objective 3: Deduce the general properties of alkali metals.
- Yes, the objective has been achieved, for

Objective 4: Define halogen group.
- Yes, the objective has been achieved, for

Objective 5: Deduce the general properties of halogens.
- Yes, the objective has been achieved, for

Objective 6: Describe the properties of elements and their uses.
- Yes, the objective has been achieved, for
2. Does the scientific content of the lesson contain precise and clear scientific concepts? State your comment

The main groups, also known as representative elements or normal elements, are the vertical columns in the modern periodic table that consist of elements with similar chemical properties. These groups are numbered 1 through 18, from left to right across the table. Elements within a group have the same number of valence electrons in their outer shells, which determines their bonding behaviour and overall chemical properties.

Here's a breakdown of the main groups:

- **Group 1 (Alkali metals)**: These are highly reactive metals that readily lose one electron to form cations with a +1 charge. Examples include lithium (Li), sodium (Na), and potassium (K). [Image of Alkali metals periodic table]
- **Group 2 (Alkaline earth metals)**: These are reactive metals that lose two electrons to form cations with a +2 charge. Examples include magnesium (Mg) and calcium (Ca). [Image of Alkaline earth metals periodic table]
- **Groups 3–12 (Transition metals)**: These metals generally form multiple cations with different charges. They also exhibit unique magnetic properties and tend to form colored compounds. Iron (Fe), copper (Cu), and titanium (Ti) are some examples of transition metals. [Image of Transition metals periodic table]
- **Group 13 (Boron group)**: Elements in this group tend to form compounds with a +3 oxidation state. Examples include boron (B) and aluminium (Al). [Image of Boron group periodic table]
- **Group 14 (Carbon group)**: This group includes elements that can form four covalent bonds. Carbon (C), silicon (Si), and germanium (Ge) are all members of this group. [Image of Carbon group periodic table]
- **Group 15 (Pnictogen group)**: The elements in this group can form compounds with oxidation states of +3, +5, or −3. Nitrogen (N), phosphorus (P), and arsenic (As) are some examples. [Image of Pnictogen group periodic table]
- **Group 16 (Chalcogens)**: Elements in this group tend to form compounds with oxidation states of −2, +4, or +6. Oxygen (O), sulfur (S), and selenium (Se) are all members of this group. [Image of Chalcogens group periodic table]
- **Group 17 (Halogens)**: These are highly reactive non-metal that readily gain one electron to form anions with a −1 charge. Examples include chlorine (Cl), bromine (Br), and iodine (I). [Image of Halogens group periodic table]
- **Group 18 (Noble gases)**: These are unreactive elements with completely filled outer electron shells. They exist as monatomic gases under normal conditions. Helium (He), neon (Ne), and argon (Ar) are some examples of noble gases. [Image of Noble gases group periodic table].
Understanding the organization of the periodic table by groups is essential for predicting the chemical behaviour of elements and for understanding how they form compounds.

3. Does the scientific content of the lesson include applications in life?
   – Yes, the lesson include application in life like silicon slides
   1– Silicon slides are used in manufacturing of computers because they are semi–conductors which their conductivity of electricity depends on the temperature.
   2– Sodium is used in liquid state as it is a good conductor of heat. It is used also in transferring heat from inside the nuclear reactor to outside to obtain vapor energy required to generate electricity.

4. Choose a part of the lesson and rephrase it in your own style to suit the topic of the lesson and the age group?
   – Alkali metals are monovalent because they have only one valence electron in their outermost s orbital. This electron is relatively loosely held, making it easy to remove and form a stable positive ion. The loss of this electron results in a filled noble gas electron configuration, which is energetically favourable.

**Lesson 4:**

1. Does the scientific content achieve the desired objectives of the lesson?
   Objective 1: Identify the bonds between its atoms and water molecules.
   – Yes, the objective has been achieved, for

   ![Molecule](image)

   Objective 2: Identify the physical and chemical properties of water.
   – Yes, the objective has been achieved, for
   – By explaining Water is (Good polar solvent – High melting and boiling point – With low density when it freezes – It’s neutral effect).

   Objective 3: Explain the abnormality of physical properties of water.
   – Yes, the objective has been achieved, for

   ![Water](image)

   Objective 4: Identify the electrolysis of water.
   – Yes, the objective has been achieved, for
   – Activity (3) investigating the process of electrolysis of water.
Objective 5: Explain why water is neutral.
- Yes, the objective has been achieved,

Substance and tools

Steps:
What is the effect of putting both of litmus papers in pure water? (Fig. 7).

From the previous we conclude that
The pure water has a neutral effect on both of litmus papers (red and blue).

Objective 6: Identify the water pollutants and their harms.
- Yes, the objective has been achieved,

Water pollutants and their harms

→ Natural pollutants: Their sources are natural phenomena like occurrence of volcanoes.
→ Artificial pollutants: Their sources are different human activities.
→ Biological pollution: originating from mixing human and animal wastes with water.

Objective 7: Identify how to keep water from pollution.
- Yes, the objective has been achieved,

Protection of water from pollution

- Getting rid of the phenomenon of discharging of sewage, factories wastes and dead animals in rivers or canals.
- Development of water purification stations (fig. 15) and making periodic analysis to determine the rate of its validity for drinking.
- Spreading environmental awareness among people about protection of water from pollution.
- Disinfecting drinking water tanks above buildings periodically. (fig. 16)
- Don’t store the tap water in empty plastic bottles of mineral water because they react with chlorine gas which is used in disinfecting of water, so the rate of cancer infection increases.

Objective 8: Appreciate the importance of water in our life.
- This objective wasn't achieved completely.

2. Does the scientific content of the lesson contain precise and clear scientific concepts? State your comment?
Here’s a breakdown of the main groups:
→ Natural pollutants: Their sources are natural phenomena like occurrence of volcanoes.
→ Artificial pollutants: Their sources are different human activities.
→ Biological pollution: originating from mixing human and animal wastes with water.

3. Does the scientific content of the lesson include applications in life?
- Dissolving the ice in the freezer quickly.

4. Choose a part of the lesson and rephrase it in your own style to suit the topic of the lesson and the age group?
- Before:

Water structure:
You studied before that water:
Molecule is composed of the combination of one oxygen atom with two hydrogen atoms to form two single covalent bonds, the angle between them is 104.5°. Fig (1).

Due to large electronegativity of oxygen compared with hydrogen, a weak electrostatic attraction is originated between water molecules which is called hydrogen bond. Fig (2).

Although these hydrogen bonds are weaker than the covalent bonds in the same molecules, they are considered to be the most important factors which are responsible for abnormality of water properties.
- After:

→ Water is a substance that is made up of atoms, which are the basic units of elements and cannot be broken into anything smaller. The atoms that make up water are 2 Hydrogen and 1 Oxygen, which is written as H2O. When the atoms combine, they become a molecule, which is a group of atoms connected together.

2.2 Analysis of the last unit in the second semester; (Biology)

Lesson 1:
1. Does the scientific content achieve the desired objectives of the lesson?

Objective 1: Describe the structure of the bisexual male and female flowers.
- Yes, the objective has been achieved, for

<table>
<thead>
<tr>
<th>Floral whirl</th>
<th>Leaves of the Floral whirl</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calyx</td>
<td>Sepals</td>
<td>Small green leaves, surrounding the flower from outside.</td>
</tr>
<tr>
<td>Corolla</td>
<td>Petals</td>
<td>Bright colored scented leaves.</td>
</tr>
<tr>
<td>Gynoeicum</td>
<td>Stamens</td>
<td>Fine threads, ending with a bulge.</td>
</tr>
<tr>
<td>Androecium</td>
<td>Carpels</td>
<td>A hollow tube like a flusk, that lies in the center of the flower.</td>
</tr>
</tbody>
</table>

- From activity (1), you can recognize that a typical flower, Fig. (5), has a thin, fine neck, ending by a bulging receptacle carrying floral leaves in four different floral wheels, which are the calyx, corolla, gynoeicum and androecium.

Objective 2: Identify the functions of caylex, corolla, and roceium, gynoeicum.
- Yes, the objective has been achieved, for

Objective 3: Determine the sex of the flower.
- Yes, the objective has been achieved, for

- Examine samples of different flowers, like roses, wallflowers, petunias, peony, and others.
- Identify the male reproductive organ (androecium) and the female reproductive organ (gynoeicum).
- Most flowers have both male and female reproductive organs together. This type of flower is known as bisexual (hermaphroditic) flower and its symbol is ♀♂. A flower bearing only male reproductive organ (androecium), and not said to be male flowers, has the symbol of Fig. (11), unlike the female flowers, Fig. (12).

Objective 4: Deduce the two types of reproduction in plants.
- Yes, the objective has been achieved, for

**Reproduction in plants**

**Self-enquiry:**
- Have you ever asked yourself, what are the types of reproduction in plants? Plants reproduce by flowers or by their genes. In the following lesson we will discuss both types in details.

**First:** sexual reproduction in plants

- Can plants reproduce without the presence of flowers? Some plants can reproduce without the presence of flowers by means of parts of the roots, stems, leaves or buds, which is known as vegetative reproduction. Vegetative reproduction may be natural or artificial.
Objective 5: Describe the steps of sexual reproduction in plants.
– Yes, the objective has been achieved, for

Objective 6: Describe the types of flower pollination.
– Yes, the objective has been achieved, for

Objective 7: Identify the methods of mixed pollination.
– Yes, the objective has been achieved, for

Objective 8: Deduce the concept of fertilization in plants.
– Yes, the objective has been achieved, for

Objective 9: Use the materials and tools to study germination of a pollen grain.
– Yes, the objective has been achieved, for
Objective 10: Define asexual reproduction in plants.
– Yes, the objective has been achieved, for

Objective 11: Conclude the types of vegetative reproduction in plants.
– Yes, the objective has been achieved, for

2. Does the scientific content of the lesson contain precise and clear scientific concepts? State your comment?

Here's a breakdown of the main groups:

→ Calyx: The outer whorl of floral leaves, also called sepals, has a function to protect the internal parts of the plant.

→ Corolla: Colourful and scented to attract insects which help in the process of reproduction.

→ Androecium: Consists of a fine filament ending by a sac known as the anther, which is divided into two parts, each of which has two chambers containing pollen grains.

3. Does the scientific content of the lesson include applications in life?
– Yes, it contains applications in life.
4. Choose a part of the lesson and rephrase it in your own style to suit the topic of the lesson and the age group?

Before:
- Asexual reproduction doesn't need flowers or seeds. Instead, a new plant grows from a part of the parent plant, like a stem, leaf, or even a root.
- How does it work?
- There are a few different ways plants can reproduce asexually. Here are a few interesting ones.
1. Stem and Leaf Cuttings: This is where a gardener takes a stem or leaf from a plant and puts it in water or soil. If done correctly, roots will grow from the cutting, and it will eventually become a whole new plant.
2. Runners and Stolon’s: Some plants, like strawberries, send out long stems called runners or stolon’s, these runners grow along the ground and eventually sprout new plants at the tips.
3. Bulbs and Tubers: Plants like potatoes, onions, and tulips have underground storage organs called bulbs or tubers. These bulbs and tubers have ‘eyes’ or buds that can grow into new plants.

After:
- Asexual reproduction doesn't need flowers or seeds. Instead, a new plant grows from a part of the parent plant, like a stem, leaf, or even a root.
- How does it work?
- There are a few different ways plants can reproduce asexually. Here are a few interesting ones.
1. Stem and Leaf Cuttings: This is where a gardener takes a stem or leaf from a plant and puts it in water or soil. If done correctly, roots will grow from the cutting, and it will eventually become a whole new plant.
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3. Bulbs and Tubers: Plants like potatoes, onions, and tulips have underground storage organs called bulbs or tubers. These bulbs and tubers have ‘eyes’ or buds that can grow into new plants.

4. Spores: Ferns and mosses reproduce using tiny reproductive units called spores. These spores float in the air and can land in new places, where they can grow into new plants.

Lesson 2:
1. Does the scientific content achieve the desired objectives of the lesson?
Objective 1: Recognize the structure of the genital system in human male.
- Yes, this objective has been achieved, for

Objective 2: Recognize the structure of the genital system in human female.
- Yes, this objective has been achieved, for

Objective 3: Conclude the function of the genital organs in human male.
- The objective was not fully achieved, there are parts that were not explained
Objective 4: Conclude the functions of the genital organs in human female.

The objective was not fully achieved, there are parts that were not explained.

Objective 5: Compare between the functions of female and male genital organs.

Yes, this objective has been achieved, for the teacher explains the lesson, the student will be able to compare them.
Objective 6: Describe the structure of the sperm

- Yes, this objective has been achieved, for

Objective 7: Describe the structure of the ovum.

- Yes, this objective has been achieved, for

Objective 8: Conclude the concept of fertilization in humans.

- Yes, this objective has been achieved, for

Objective 9: Recognize some sexually transmitted diseases

- Yes, this objective has been achieved, for

The sperms rush towards the ovum, at the beginning of fallopian tubes (Fig. 10). The head of the sperm secretes a material that dissolves the wall of the ovum and facilitates its penetration, (Fig. 11b). After the process of successful penetration, the ovum enclosing itself by a membrane that prevents any other sperm from penetration, (Fig. 11a)

The new born baby will carry the genetic traits of his parents.
Objective 10: Recognize the different ways of preservation against sexually transmitted diseases.

→ Yes, this objective has been achieved, for

2. Does the scientific content of the lesson contain precise and clear scientific concepts? State your comment?
   → The testes: are two glands, elliptical in shape and their function is to produce sperms and the male hormone known as testosterone.
   → The penis: It’s an organ composed of a sponge-like tissue, the urethra passes through it, and it ends by sexual opening.
   → The ovaries: The ovaries are: two glands, each one is in the size of a peeled almond like, and they lie inside the body in the lower part of the abdominal cavity from the back.
   → Estrogen: which is responsible for the appearance of secondary sexual characters in female.
   → Progesterone: which is necessary for the continuity of pregnancy.
   → Fertilization in human: Sperm and egg unite in one of the fallopian tubes (zygote).

3. Does the scientific content of the lesson include applications in life?
   The lesson doesn’t contain life applications.

4. Choose a part of the lesson and rephrase it in your own style to suit the topic of the lesson and the age group?
   Before:

   → The vagina:
     • The description: A muscular tube that has the ability to expand at birth.
     • The location: It extends from the uterus and ends by the external genital opening.
     • The function: expands during labour to deliver the baby.

   After:
   – The vagina:
     • The description: A muscular tube that has the ability to expand at birth.
     • The location: It extends from the uterus and ends by the external genital opening.
     • The function: expands during labour to deliver the baby.

At the end of the analysis, we found some deficiencies in the school textbook and we will explain these in the following table:
<table>
<thead>
<tr>
<th>Unit</th>
<th>Lesson</th>
<th>Comment</th>
</tr>
</thead>
</table>
| First unit in the first semester (Chemistry) | Lesson 1 | 1–The book was not clear in mentioning the categories of the periodic table.  
2–In objective (6), the lesson did not provide any appreciation for the efforts of scientists. |
| Lesson 2 | 1– There are details that were not explained in a simplified manner for the student to understand in an easy way.  
2– Objective (3), was not explained directly, but rather relied on the student’s understanding and did not take into account individual differences between students in understanding the information, as it mentioned metals and did not mention non–metals and metalloids.  
3– In objective (4), did not mention anything about it, but rather relied on clarifying the teacher’s explanation to the student and did not provide me with any information about it  
4– In objective (5), the polarity of the compounds was not mentioned directly, and therefore the teacher must explain it |
| Lesson 3 | 1. There is too little information for the student to understand the lesson.  
2. In Objectives (5 and 6), the lesson did not talk about earth metals.  
3. The student cannot compare between the earth metal and alkanil metal because the lessons don’t explain the earth metals. |
### Lesson 4

1– Objective (2), the book didn’t explain physical and chemical properties of water individually, as both physical and chemical properties were explained one after another and it didn’t classify even the properties are physical or chemical.  
2– Objective (6), there was a deficiency about the harms of the water pollutants and the objective at all was explained in a very short paragraph.  
3– Objective (8), this objective was concerned to explain the importance of water in our life, but it was displayed in a case of discussion or enrichment information, so this objective was neglected.

### Last unit in the second semester (Biology)

#### Lesson 1

1– The lesson is very long and contains three basic topics: plant structures and its sexual parts Sexual reproduction in plants Asexual reproduction in plants They can be explained in separate lessons.  
2– During the study of plant parts, we must focus on the sexual parts of the plant and give them some importance in the information because the lesson revolves around the subject of reproduction.  
3– In objective (5), it was necessary to explain the parts of the process of asexual reproduction in plants in a similar manner, or to develop an idea to understand the relationship between fertilization and pollination in plants.  
4– In objectives (6 and 7), the comprehensive paragraph on pollination in plants, which includes the sixth and seventh objectives, in which the definition of pollination is deficient in information, and the picture provided for clarification gives the student a wrong idea about the definition of mixed pollination.  
5– Objective (10), which is to define asexual reproduction in plants, lacks important
information for the student, and therefore the information presented in the textbook is incomplete.

Lesson 2

1– The lesson is very long, the lesson talks about the reproductive system in males and females, the functions of the reproductive organs, and the composition of the egg and sperm. It was possible to divide it into more than one lesson.

2– The lesson contains randomness in the arrangement of information, and this may cause distraction for the student. For example, in the first lesson, he mentioned that sperm contains half of the genetic material, then he continued explaining the lesson without mentioning the reason, and mentioned the reason at the end of the lesson.

3– There is a whole section that has nothing to do with the content of the lesson. This is the Diseases section. He mentioned a section about diseases that are not transmitted through sex, and no purpose was mentioned for them, and this lengthens the lesson.

3. Methods of Research and the tools used.

To answer the study’s questions, the researchers conducted a questionnaire on a sample of (10) students in the second year of preparatory school.

The questionnaire consists of questions that measure the extent to which the book achieves the objectives and concepts contained in the two units under study.

The three-way Likert scale was relied upon to conduct and analyse this questionnaire.
4. Results of Research

Table (2): A questionnaire to determine the extent to which the book under study achieves the objectives and concepts in the first unit under study.

<table>
<thead>
<tr>
<th>Objectives</th>
<th>Weighted mean</th>
<th>General trend</th>
</tr>
</thead>
<tbody>
<tr>
<td>Determine the chemical and natural properties of water.</td>
<td>1.8</td>
<td>neutral</td>
</tr>
<tr>
<td>Explain the irregularity of the natural properties of water.</td>
<td>1.8</td>
<td>neutral</td>
</tr>
<tr>
<td>Recognize the electrolysis of water.</td>
<td>1.8</td>
<td>neutral</td>
</tr>
<tr>
<td>Describe the chemical bonds among the atoms and molecules of water (covalent and hydrogen).</td>
<td>2.7</td>
<td>agree</td>
</tr>
<tr>
<td>Determine water pollutants and their bad effects.</td>
<td>2.6</td>
<td>agree</td>
</tr>
<tr>
<td>Recognize the principles of elements. classification in the modern periodic table.</td>
<td>2.8</td>
<td>agree</td>
</tr>
<tr>
<td>Estimate scientists efforts in discovering, classifying and investing elements.</td>
<td>2.8</td>
<td>agree</td>
</tr>
<tr>
<td>Determine the location and properties of some elements in the modern periodic table by recognizing their atomic numbers.</td>
<td>2.4</td>
<td>agree</td>
</tr>
<tr>
<td>Recognize of halogens.</td>
<td>2.8</td>
<td>agree</td>
</tr>
<tr>
<td>Describe elements properties and their uses.</td>
<td>2.4</td>
<td>agree</td>
</tr>
<tr>
<td>Use tools, materials and instruments in studying elements properties.</td>
<td>2.4</td>
<td>agree</td>
</tr>
<tr>
<td>Follow the efforts and attempts of some scientists to classify elements (Mendleev – Moseley – Modern Periodic Table).</td>
<td>2.6</td>
<td>agree</td>
</tr>
<tr>
<td>Recognize the principles of elements classification in the modern periodic table.</td>
<td>2.6</td>
<td>agree</td>
</tr>
</tbody>
</table>
Explain the equivalence of water. & 3 & agree \\
Compare between metals, nonmetals, semimetals and inert gases in their electronic configuration and chemical activity. & 2.2 & neutral \\
Describe main groups in the modern periodic table. & 2.2 & neutral \\

Table (3): A questionnaire to determine the extent to which the book under study achieves the objectives and concepts in the second unit under study.

<table>
<thead>
<tr>
<th>Objectives</th>
<th>Weighted mean</th>
<th>General trend</th>
</tr>
</thead>
<tbody>
<tr>
<td>Describe the structure of the bisexual, male and female flowers.</td>
<td>1.8</td>
<td>neutral</td>
</tr>
<tr>
<td>Describe the structure of the bisexual, male and female flowers.</td>
<td>2.6</td>
<td>agree</td>
</tr>
<tr>
<td>Describe the structure of the bisexual, male and female flowers.</td>
<td>2.5</td>
<td>agree</td>
</tr>
<tr>
<td>Identify the functions of the calyx, corolla androecium and gynoecium.</td>
<td>2.8</td>
<td>agree</td>
</tr>
<tr>
<td>Identify the functions of the calyx, corolla androecium and gynoecium.</td>
<td>2.5</td>
<td>agree</td>
</tr>
<tr>
<td>Determine the sex of the flower.</td>
<td>2.4</td>
<td>agree</td>
</tr>
<tr>
<td>Describe the steps of sexual reproduction in plants.</td>
<td>2.7</td>
<td>agree</td>
</tr>
<tr>
<td>Describe the types of flower pollination.</td>
<td>2.6</td>
<td>agree</td>
</tr>
<tr>
<td>Deduce the concept of fertilization in plants.</td>
<td>2.1</td>
<td>neutral</td>
</tr>
<tr>
<td>Deduce the concept of fertilization in plants.</td>
<td>2.1</td>
<td>neutral</td>
</tr>
<tr>
<td>Identify the methods of mixed pollination.</td>
<td>2</td>
<td>neutral</td>
</tr>
<tr>
<td>Activity</td>
<td>Score</td>
<td>Level</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------</td>
<td>-------</td>
<td>--------</td>
</tr>
<tr>
<td>Define asexual reproduction in plants.</td>
<td>2.4</td>
<td>agree</td>
</tr>
<tr>
<td>Conclude the types of vegetative reproduction in plants.</td>
<td>2.2</td>
<td>neutral</td>
</tr>
<tr>
<td>Conclude the types of vegetative reproduction in plants.</td>
<td>2.7</td>
<td>agree</td>
</tr>
<tr>
<td>Recognize the structure of the genital system in human male.</td>
<td>2.6</td>
<td>agree</td>
</tr>
<tr>
<td>Recognize the structure of the genital system in human female.</td>
<td>2.8</td>
<td>agree</td>
</tr>
<tr>
<td>Conclude the function of the genital organs in human male.</td>
<td>2.2</td>
<td>neutral</td>
</tr>
<tr>
<td>Conclude the functions of the genital organs in human female.</td>
<td>2.5</td>
<td>agree</td>
</tr>
<tr>
<td>Compare between the functions of female and male genital organs.</td>
<td>2.6</td>
<td>agree</td>
</tr>
<tr>
<td>Describe the structure of the sperm.</td>
<td>2.5</td>
<td>agree</td>
</tr>
<tr>
<td>Describe the structure of the ovum.</td>
<td>2.6</td>
<td>agree</td>
</tr>
<tr>
<td>Conclude the concept of fertilization in humans.</td>
<td>2.1</td>
<td>neutral</td>
</tr>
<tr>
<td>Recognize some sexually transmitted diseases,</td>
<td>2.2</td>
<td>neutral</td>
</tr>
<tr>
<td>Recognize the different ways of preservation against sexually transmitted diseases.</td>
<td>2.4</td>
<td>agree</td>
</tr>
</tbody>
</table>
5. Interpretation of Results
By extrapolating the table (2), it turns out that the general average of achieving the science book for the second year of Preparatory school for scientific objectives and concepts in the first unit in the first semester is 2.5, which represents, in the scale of estimates of the applied three-way Likert scale, the direction (agree). Hence, it is clear from analysing the results of this table that the percentage of achieving the science book for the second year of middle school for scientific objectives and concepts in the first unit in the first semester is 83.33%. Also, by extrapolating the table (3), it turns out that the general average of achieving the science book for scientific objectives and concepts in the last unit in the second semester is 2.412, which represents, in the scale of estimates of the applied three-way Likert scale, the direction (agree). Hence, it is clear from analysing the results of this table that the percentage of achieving the science book for the second year of Preparatory school for scientific objectives and concepts in the last unit in the second semester is 80.4%.

6. Conclusion
In light of the results of the current study, the following should be taken into our interest:
1. The interest of those preparing textbooks for science and other courses is to review these books before applying and using them.
2. The interest of those responsible for monitoring the implementation of science books in the middle school stage, taking into account the results reached by the current study.
3. The necessity of the participation of specialists in curricula and teaching methods and specialists in educational technology when preparing the textbook in science and other academic courses.

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First of all gratitude and thanks to gracious Allah who always helps and guides us. We would like to thank the prophet Mohamed “peace be upon him” who urges us to seek knowledge and who is the teacher of mankind. We would like also to thank the research supervisor, who is Dr. Heba Ali Hassan, Lecturer of Pure Mathematics, Faculty of Education, Ain Shams University, who provided us with guidance and continuous encouragement. She did her best for the success of this work through many discussions, precious comments, valuable reviews and remarks. Her efforts during revision of this research is an invaluable.
Finally, we are appreciative to our kind parents and our beloved family for their support, patience, sacrifice and continuous encouragement.

References and Sources

