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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.(Alayasrah,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

The activity you did, doesn't differ from what the Russian Scientist Mendeleev did. In 1871. Fig. (1), he recorded on single cards: the names of the elements, their atomic weights and their important properties. He arranged the similar elements in vertical columns called "groups" later. He discovered that the elements were arranged in an ascending order according to their atomic weights from left to right in the horizontal rows, which were later called "periods" and their properties are periodically repeated at the beginning of each new period. Mendeleev explained his periodic table in his book "Principles of Chemistry" In 1871, and classified the known elements until this time to be (67) elements, and he also classified each main group into two subgroups (A, B) where he found differences between their properties.

Mendeleev
Fig. (1)

Objective 2: Recognize the principles of elements classification in the modern periodic table:

– Yes, the objective has been achieved, for

Their atomic numbers and the way of filling the energy sublevels with electrons.

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

Steps :

1. Write the electronic configuration for elements explained in the table (2).
2. Determine the number of energy levels, the number of electrons in the outermost energy level for each element.
3. Determine the number of period and group for each element (Use the modern periodic table).

Table (2)

Element	$_{20}Ca$	$_{15}P$	$_{10}Ne$	$_{1}H$
* Electronic configuration	+20	+15	+10	+1
* Energy levels	.....	.....	.....	.....
* Number of period	.....	.....	.....	.....
* Number of electrons in outermost energy level	.....	.....	.....	.....
* Number of group				

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

Steps :

1. In the table (3) determine the number of energy levels occupied by electrons for each element by knowing its period number.
2. Write below the outermost energy level of each element, the number of electrons in it by knowing the number of its group.
3. Complete the number of electrons in the inner energy levels filled with electrons for each element by knowing the number of its group.
4. Write the number of positive protons inside the nucleus for each element by knowing the number of electrons.

Objective 5: Estimate the importance of discipline and organization in our life.

– Yes, the objective has been achieved, for

Life application | **House library**

- Form a bookstore at your home (Use Family Library - school library). Apply what you have studied about the elements classification in arranging them in horizontal rows and vertical columns. including the subject of the book (scientific, historical, religious, ...) and making an index for the books to facilitate the search process.

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:

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.

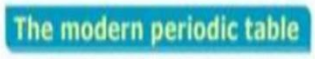
The Modern Periodic Table: Developed by Dmitri Mendeleev, this table arranges elements in rows (periods) and columns (groups) based on atomic numbers. It not only organizes existing elements but also predicts the existence of elements not yet discovered.

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 The bars used in building concrete are made of iron, not copper, because iron is harder than copper.

– 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?



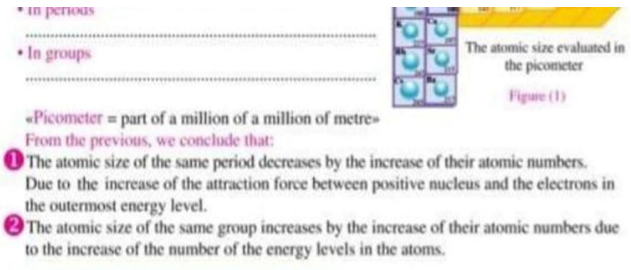
The modern periodic table consists of 7 periods and 18 groups, and it consists of four main blocks (s, p, d, f). It contains 118 elements, 92 of which are found in the Earth's crust, and the rest are chemically synthesized in the laboratory, and the elements in it are classified according to the atomic 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


• In periods
• In groups
The atomic size evaluated in the picometer
Figure (1)
«Picometer = part of a million of a million of metre»
From the previous, we conclude that:
1 The atomic size of the same period decreases by the increase of their atomic numbers. Due to the increase of the attraction force between positive nucleus and the electrons in the outermost energy level.
2 The atomic size of the same group increases by the increase of their atomic numbers due to the increase of the number of the energy levels in the atoms.

Objective 2: The electronegativity property:

– Yes, the objective has been achieved, for

It is defined as the ability of the atom in the covalent molecule to attract the electrons of the chemical bond towards itself. as that in water molecule and ammonia molecule that are known as a"polar compounds".

Polar ammonia molecule Polar water molecule

(Fig. 3)
Figure (2)

Objective 3:Metallic and non–metallic property:

– Yes, the objective has been achieved, for

nonmetals.

3 The metallic and nonmetallic property:

– Elements are divided into 4 main kinds, which are :

• Metals. • Nonmetals. • Semimetals (Metalloids). • Inert gases.

Metals are characterized by that their outermost shells contain less than (4) electrons and tend to lose these electrons during the chemical reaction. To reach the nearest inert gas preceding them in the periodic table, forming positive ions.

• What do you expect the number of valenc shell electrons for nonmetals will be ?

.....

• What kind of ions which are formed by nonmetals? .....

What is your explanation?

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

nonmetals.

3 The metallic and nonmetallic property:

– Elements are divided into 4 main kinds, which are :

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• What do you expect the number of valenc shell electrons for nonmetals will be ?

.....

• What kind of ions which are formed by nonmetals? .....

What is your explanation?

Objective 6: Identify the behaviour of some metals of the chemical activity series with water.

– Yes, the objective has been achieved, for

nonmetals.

3 The metallic and nonmetallic property:

– Elements are divided into 4 main kinds, which are :

• Metals. • Nonmetals. • Semimetals (Metalloids). • Inert gases.

Metals are characterized by that their outermost shells contain less than (4) electrons and tend to lose these electrons during the chemical reaction. To reach the nearest inert gas preceding them in the periodic table, forming positive ions.

• What do you expect the number of valenc shell electrons for nonmetals will be ?

.....

• What kind of ions which are formed by nonmetals? .....

What is your explanation?

Objective 7: Use tools and substances to discover the chemical properties of metals and non–metals.

Yes, the objective has been achieved, for

Activity (3) Discovering the chemical properties of metals.

Substances and tools :

• Magnesium strip. • Test tube.
• Water. • Dilute hydrochloric acid.
• A jar filled with oxygen.

Steps :

1. Put a piece of magnesium strip in the test tube, then add the dil. hydrochloric acid.
2. Heat another piece of magnesium strip till glowing and put it in the jar filled will oxygen fig (4).
3. Add some water to the jar with shaking.

Burning of magnesium in oxygen
Figure (4)

Observations :

1. Do magnesium react with the acid? How can you detect?

.....

2. Does magnesium oxide dissolve in water ?

.....

What is the effect of adding drops of violet litmus to the solution fig (5)? .....

The effect of adding violet litmus to magnesium oxide solution
Figure (5)

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 nonmental 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?

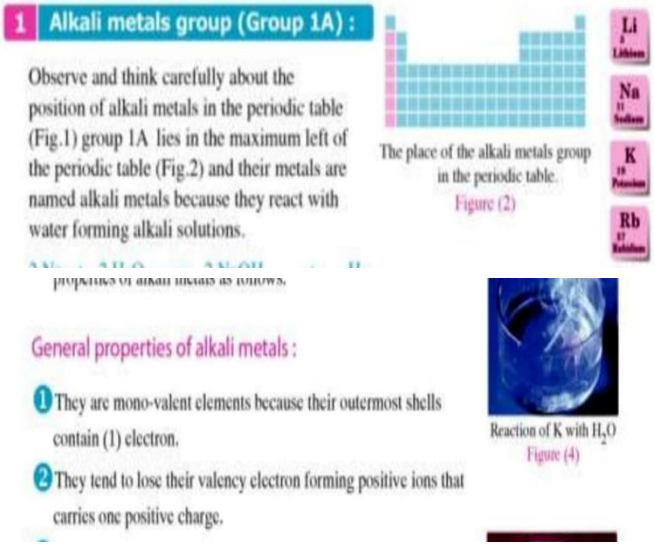
Objective 1: Determine the valency of alkali metals.

– 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


1 Alkali metals group (Group 1A) :

Observe and think carefully about the position of alkali metals in the periodic table (Fig.1) group 1A lies in the maximum left of the periodic table (Fig.2) and their metals are named alkali metals because they react with water forming alkali solutions.

The place of the alkali metals group in the periodic table.
Figure (2)

Li Lithium
Na Sodium
K Potassium
Rb Rubidium

properties of alkali metals as follows:

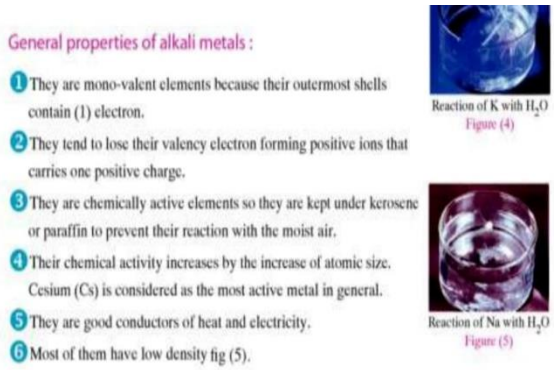
General properties of alkali metals :

1. They are mono-valent elements because their outermost shells contain (1) electron.
2. They tend to lose their valency electron forming positive ions that carries one positive charge.

Reaction of K with H_2O
Figure (4)

Objective 3: Deduce the general properties of alkali metals.

–Yes, the objective has been achieved, for


General properties of alkali metals :

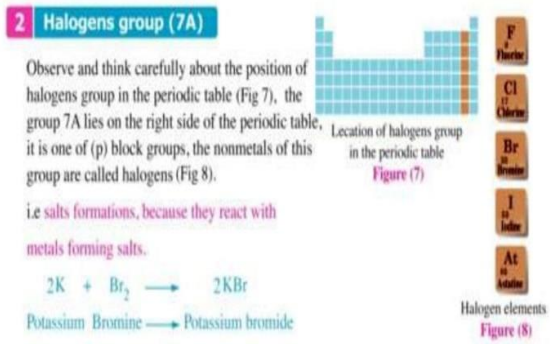
1. They are mono-valent elements because their outermost shells contain (1) electron.
2. They tend to lose their valency electron forming positive ions that carries one positive charge.
3. They are chemically active elements so they are kept under kerosene or paraffin to prevent their reaction with the moist air.
4. Their chemical activity increases by the increase of atomic size. Cesium (Cs) is considered as the most active metal in general.
5. They are good conductors of heat and electricity.
6. Most of them have low density fig (5).

Reaction of K with H_2O
Figure (4)

Reaction of Na with H_2O
Figure (5)

Objective 4: Define halogen group.

– Yes, the objective has been achieved, for


2 Halogens group (7A)

Observe and think carefully about the position of halogens group in the periodic table (Fig 7), the group 7A lies on the right side of the periodic table, it is one of (p) block groups, the nonmetals of this group are called halogens (Fig 8).

Lecation of halogens group in the periodic table
Figure (7)

i.e salts formations, because they react with metals forming salts.

$2K + Br_2 \longrightarrow 2KBr$

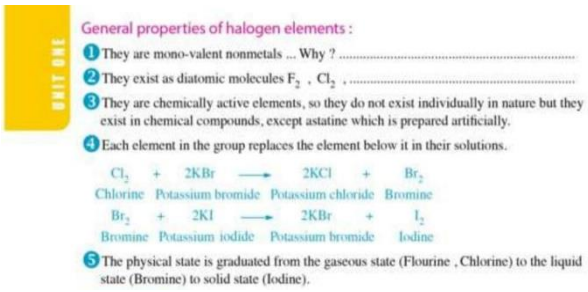
Potassium Bromine ⟶ Potassium bromide

F Fluorine
Cl Chlorine
Br Bromine
I Iodine
At Astatine

Halogen elements
Figure (8)

Objective 5: Deduce the general properties of halogens.

– Yes, the objective has been achieved, for


UNIT ONE

General properties of halogen elements :

1. They are mono-valent nonmetals ... Why ? .....
2. They exist as diatomic molecules F_2 , Cl_2 , ...
3. They are chemically active elements, so they do not exist individually in nature but they exist in chemical compounds, except astatine which is prepared artificially.
4. Each element in the group replaces the element below it in their solutions.

$Cl_2 + 2KBr \longrightarrow 2KCl + Br_2$
Chlorine Potassium bromide Potassium chloride Bromine

$Br_2 + 2KI \longrightarrow 2KBr + I_2$
Bromine Potassium iodide Potassium bromide Iodine

5. The physical state is graduated from the gaseous state (Flourine , Chlorine) to the liquid state (Bromine) to solid state (Iodine).

Objective 6: Describe the properties of elements and their uses.

– Yes, the objective has been achieved, for


The properties of elements and their uses

The uses of elements or their compounds depend on their properties. You have studied before some of traditional uses for known elements. Now you will know the uses of some elements in the modern techniques.

1. 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 vapour energy required to generate electricity (Fig 10).
2. Silicon slides are used in manufacturing of computers because they are semi-conductors which their conductivity of electricity depends on the temperature.
3. Liquefied nitrogen is used in preservation of the cornea of the eye because it has a low boiling point (-196 °C.)
4. The radioactive cobalt 60 is used in food preservation because gamma rays which come out from it prevent the reproduction of microbial cells without an effect on hygiene.

Core of nuclear reactor
Figure (10)

Electronic slide
Figure (11)

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?

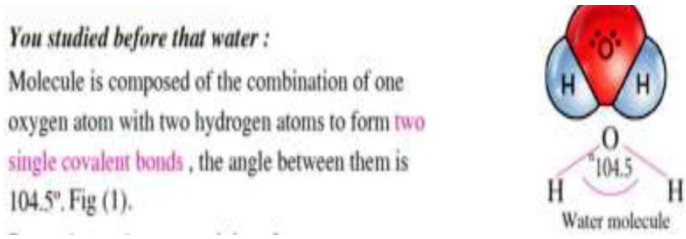
– Alkali metals are monovalent because they have only one valence electron in their outermost s orbital. This electron is relatively loosely held, making it easy to remove and form a stable positive ion. The loss of this electron results in a filled noble gas electron configuration, which is energetically 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



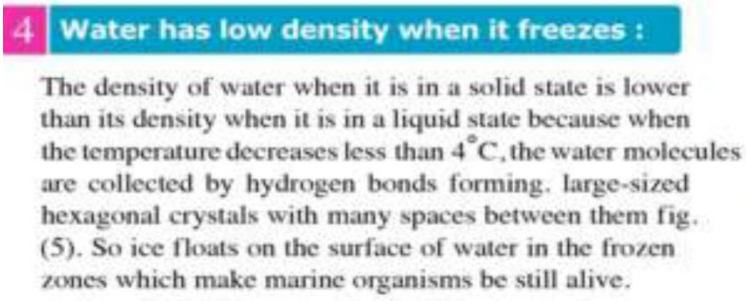
Objective 2: Identify the physical and chemical properties of water.

– 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



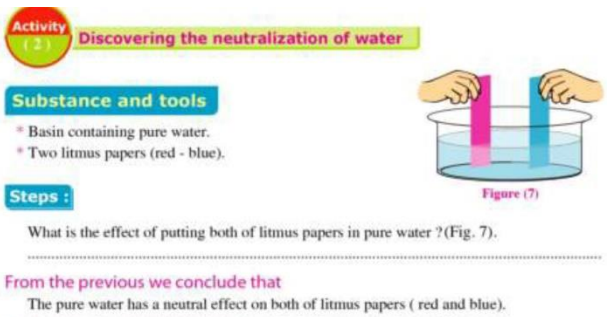
Objective 4: Identify the electrolysis of water.

– 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, for


Activity (2) Discovering the neutralization of water

Substance and tools

* Basin containing pure water.
* Two litmus papers (red - blue).

Figure (7)

Steps :

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

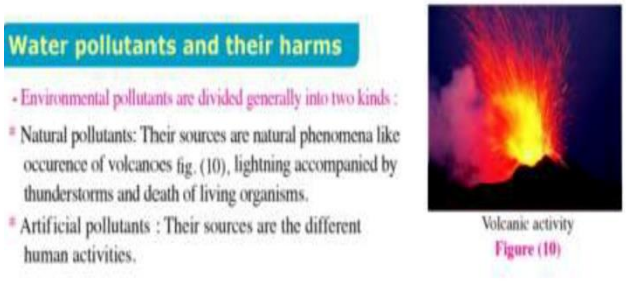
.....

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, for


Water pollutants and their harms

- Environmental pollutants are divided generally into two kinds :

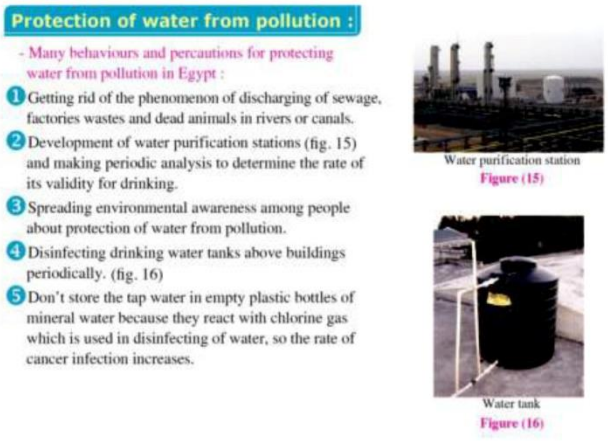
* Natural pollutants: Their sources are natural phenomena like occurence of volcanoes fig. (10), lightning accompanied by thunderstorms and death of living organisms.
* Artificial pollutants : Their sources are the different human activities.

Volcanic activity

Figure (10)

Objective 7: Identify how to keep water from pollution.

– Yes, the objective has been achieved, for


Protection of water from pollution :

- Many behaviours and percautions for protecting water from pollution in Egypt :

1. Getting rid of the phenomenon of discharging of sewage, factories wastes and dead animals in rivers or canals.
2. Development of water purification stations (fig. 15) and making periodic analysis to determine the rate of its validity for drinking.
3. Spreading environmental awareness among people about protection of water from pollution.
4. Disinfecting drinking water tanks above buildings periodically. (fig. 16)
5. 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.

Water purification station

Figure (15)

Water tank

Figure (16)

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:

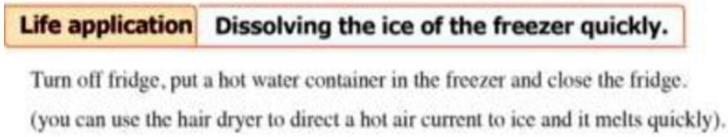
→ Natural pollutants: Their sources are natural phenomena like occurrence of volcanoes.

→ 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.

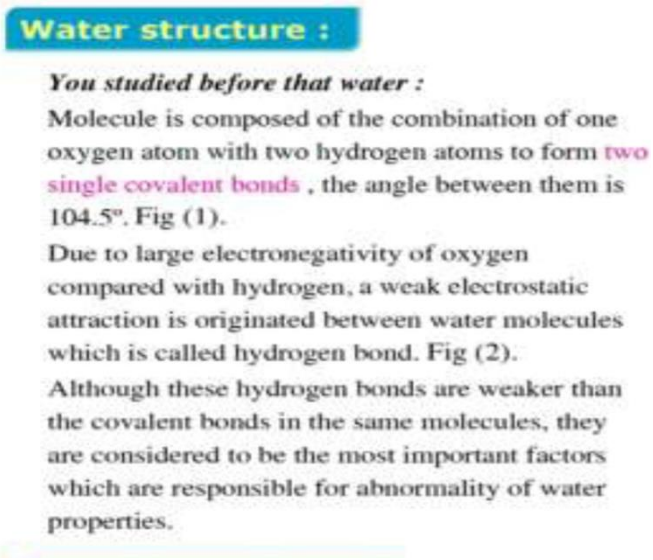

Life application Dissolving the ice of the freezer quickly.

Turn off fridge, put a hot water container in the freezer and close the fridge.

(you can use the hair dryer to direct a hot air current to ice and it melts 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:

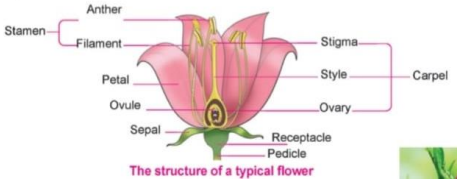
1.Does the scientific content achieve the desired objectives of the lesson?

Objective 1: Describe the structure of the bisexual male and female flowers.

– Yes, the objective has been achieved, for

Floral whorl	Leaves of the Floral whorl	Description
Calyx	Sepals	Small green leaves, surrounding the flower from outside.
Corolla	Petals	Bright colored scented leaves.
Gynoecium	Stamen	Fine threads, ending with a bulge.
Androecium	Carpels	A hollow tube like a flask, that lies in the center of the flower.

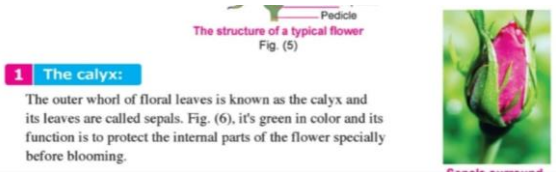
From activity (1), you can recognize that a typical flower, Fig. (5), has a thin, fine neck ending by a bulging receptacle carrying floral leaves in four different floral whorls, which are the calyx, corolla, gynoecium and androecium.



The structure of a typical flower

Objective 2: Identify the functions of caylex, corolla, and roceium, gynoecium.

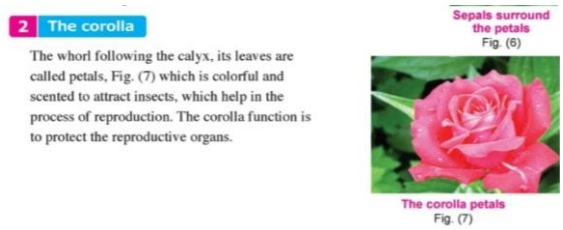
– Yes, the objective has been achieved, for

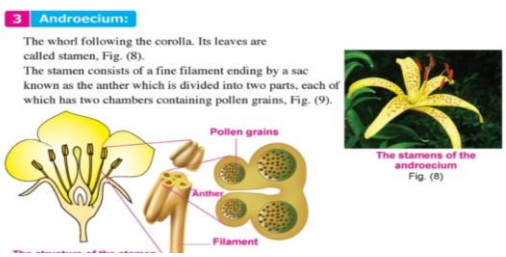


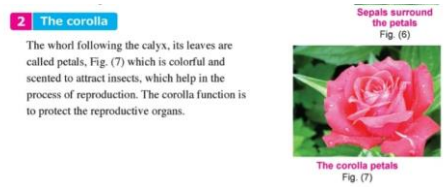
The structure of a typical flower
Fig. (5)

1 The calyx:

The outer whorl of floral leaves is known as the calyx and its leaves are called sepals. Fig. (6), it's green in color and its function is to protect the internal parts of the flower specially before blooming.

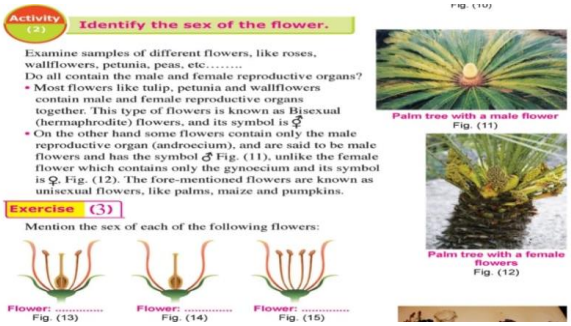






Objective 3: Determine the sex of the flower.

– Yes, the objective has been achieved, for



Objective 4: Deduce the two types of reproduction in plants.

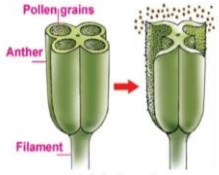
– Yes, the objective has been achieved, for

Objective 5: Describe the steps of sexual reproduction in plants.

– Yes, the objective has been achieved, for

1 Pollination:

When pollen grains mature and become well developed, the anther splits up longitudinally, releasing pollen grains in the air, Fig. (17). The process of the transfer of pollen grains from anthers of a flower to the stigma is called pollination.



spread palm tree's pollen grains over their female flowers.

2 Fertilization:

Fertilization in plants means, the fusion of the male cell (pollen grain) with the (female cell) ovum. How does this happen?

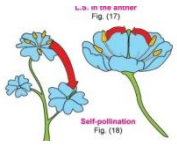
Participate with your classmates in the co-operative group, in performing the following activity:

Objective 6: Describe the types of flower pollination.

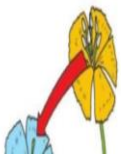
– Yes, the objective has been achieved, for

Types of pollination:

When pollen grains transfer from the anther to the stigma in the same flower or in another flower but in the same plant, this is called auto (self) pollination Fig. (18).



On the other hand when pollen grains transfer from the anther of one flower to the stigma of another one on a different plant, this is called mixed pollination. Fig. (19).



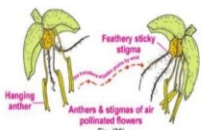
Objective 7: Identify the methods of mixed pollination.

– Yes, the objective has been achieved, for

1 pollination by air:

Observe Fig. (20) with your classmates.....what do you conclude?

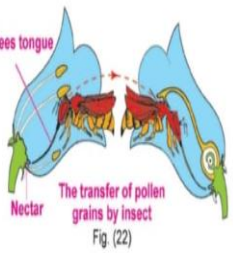
Flowers pollinated by air are characterized by the presence of hanging anthers, easily opened by air and their stigmas are feathery- like and sticky to catch pollen grains. Fig. (20)



Air pollinated flowers produce huge numbers of pollen grains to compensate what are lost in air Fig. (21). The pollen grains of such flowers are light in weight, dry and can be easily carried by air currents.

2 Pollination by insects:

Observe Fig. (22) with your classmates.....what do you conclude? The flowers pollinated by insects are characterized by colored, scented petals to attract insects, like bees, to feed on its nectar. The pollen grains of such flowers are characterized by being, sticky or having coarse surfaces to stick to the insect's body. Fig. (22)



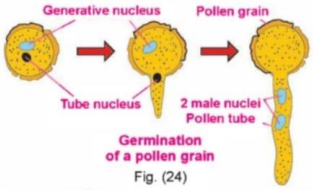
3 Artificial pollination:

It means pollination taking place by the help of man; as it occurs when the Gardener spread palm tree's pollen grains over their female flowers.

Objective 8: Deduce the concept of fertilization in plants.

– Yes, the objective has been achieved, for

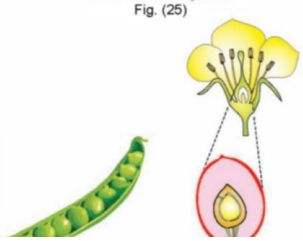
After pollination, the pollen grain stick to the stigma, this secretes a sugary solution. The pollen grain then begins to germinate forming a pollen tube containing two male nuclei Fig. (24).



The pollen tube extends through the style and reaches the ovum by the micropyle opening in the ovary Fig. (25). The tip of the pollen tube degenerates in order that one of the two male nuclei fuses with the egg to form a fertilized ovum which is known as the zygote. The zygote in turn undergoes a process of successive divisions to form the embryo inside the ovum, which develops to become a seed at the same time the ovary grows to become the fruit.

Fruits differ from each other according to the nature of the ovary, if the ovary contains one ovum; it gives rise to a fruit with a single seed inside it, like olive and peaches. Fig. (26)

However, an ovary with many ova, gives rise to a fruit with many seeds inside it, like beans and peas. Fig. (27)



Objective 9: Use the materials and tools to study germination of a pollen grain.

– Yes, the objective has been achieved, for

Activity (3) Pollen grain germination:

Materials and tools :

- Diluted sugar solution.
- Glass slides and covers.
- Water.
- Microscope.


Microscope
Fig. (23)

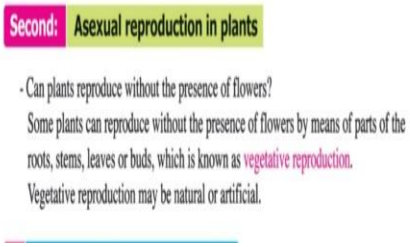
Steps :

1. Put a drop of the diluted sugar solution onto a glass slide, then add pollen grains, and cover them with a glass cover.
2. Repeat the previous step, replacing diluted sugar solution with water.
3. Put both slides in a dark warm place for half an hour.
4. Examine both slides using the microscope Fig. (23), What do you observe? .....

- Does the pollen grain show any change after adding the diluted sugar solution drop?
- What is the relation between what you have observed and what happens when the pollen grain falls on the stigma of a flower?.....
- What is your explaination?

Objective 10: Define asexual reproduction in plants.

– Yes, the objective has been achieved, for



Second: Asexual reproduction in plants

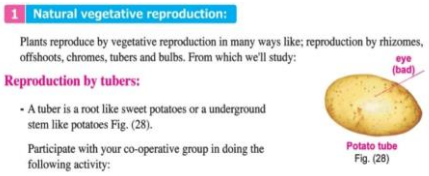
- Can plants reproduce without the presence of flowers?

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 11: Conclude the types of vegetative reproduction in plants.

– Yes, the objective has been achieved, for



1 Natural vegetative reproduction:

Plants reproduce by vegetative reproduction in many ways like; reproduction by rhizomes, offshoots, chromes, tubers and bulbs. From which we'll study:

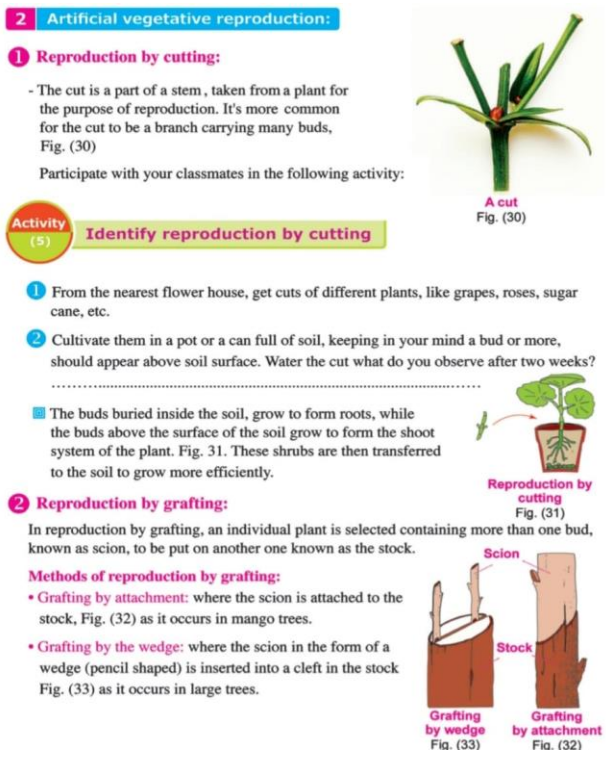
Reproduction by tubers:

- A tuber is a root like sweet potatoes or a underground stem like potatoes Fig. (28).

Participate with your co-operative group in doing the following activity:

eye (bud)

Potato tube
Fig. (28)



2 Artificial vegetative reproduction:

1 Reproduction by cutting:

- The cut is a part of a stem, taken from a plant for the purpose of reproduction. It's more common for the cut to be a branch carrying many buds, Fig. (30)

Participate with your classmates in the following activity:

A cut
Fig. (30)

Activity (5) Identify reproduction by cutting

1. From the nearest flower house, get cuts of different plants, like grapes, roses, sugar cane, etc.
2. Cultivate them in a pot or a can full of soil, keeping in your mind a bud or more, should appear above soil surface. Water the cut what do you observe after two weeks?

……

The buds buried inside the soil, grow to form roots, while the buds above the surface of the soil grow to form the shoot system of the plant. Fig. 31. These shrubs are then transferred to the soil to grow more efficiently.

Reproduction by cutting
Fig. (31)

2 Reproduction by grafting:

In reproduction by grafting, an individual plant is selected containing more than one bud, known as scion, to be put on another one known as the stock.

Methods of reproduction by grafting:

- Grafting by attachment: where the scion is attached to the stock, Fig. (32) as it occurs in mango trees.
- Grafting by the wedge: where the scion in the form of a wedge (pencil shaped) is inserted into a cleft in the stock Fig. (33) as it occurs in large trees.

Scion

Stock

Grafting by wedge
Fig. (33)

Grafting by attachment
Fig. (32)

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:

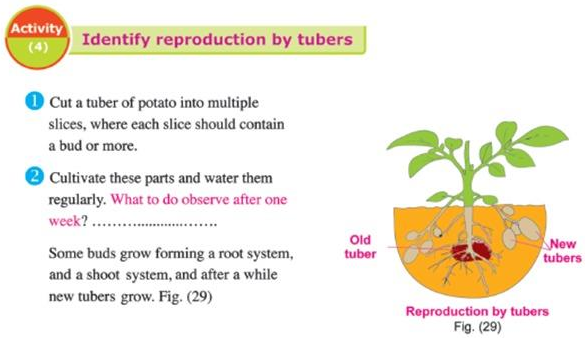
→ Calyx: The outer whorl of floral leaves, also called sepals, has a function to protect the internal parts of the plant.

→ 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.



Activity (4) Identify reproduction by tubers

1. Cut a tuber of potato into multiple slices, where each slice should contain a bud or more.
2. Cultivate these parts and water them regularly. What to do observe after one week? ……

Some buds grow forming a root system, and a shoot system, and after a while new tubers grow. Fig. (29)

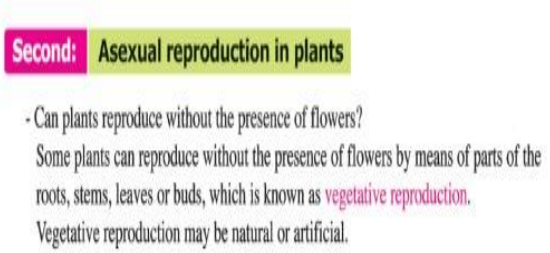
Old tuber

New tubers

Reproduction by tubers
Fig. (29)

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:



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.

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.

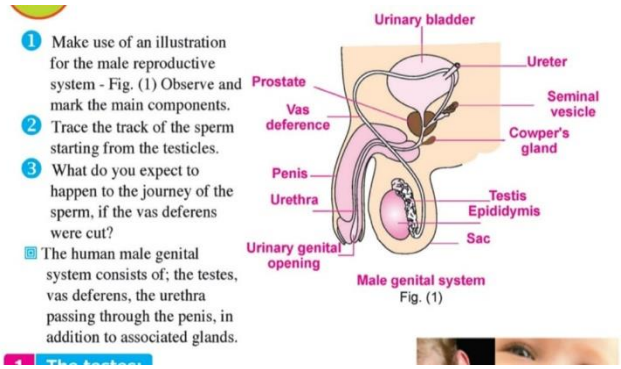
4. Spores: Ferns and mosses reproduce using tiny reproductive units called spores. These spores float in the air and can land in new places, where they can grow into new plants.

Lesson 2:

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

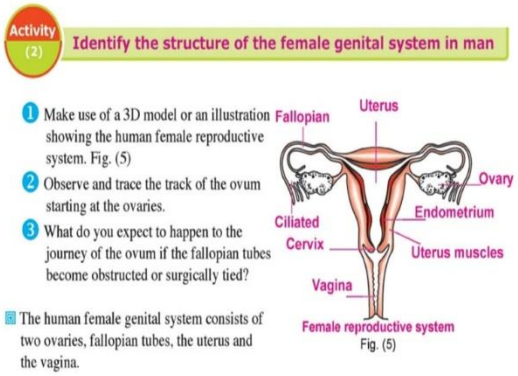
Objective 1: Recognize the structure of the genital system in human male.

–Yes, this objective has been achieved, for



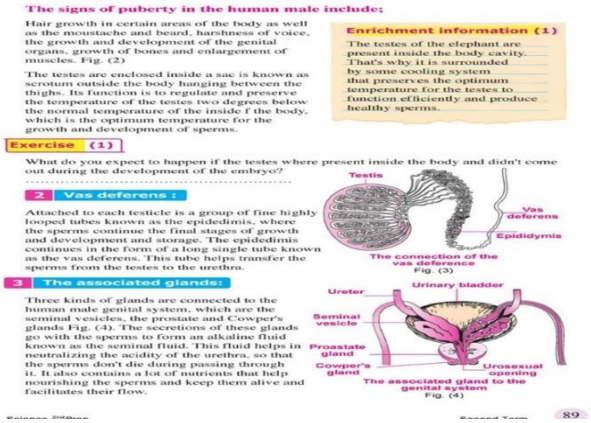
Objective 2: Recognize the structure of the genital system in human female.

–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



The signs of puberty in the human male include:

Hair growth in certain areas of the body as well as the moustache and beard, harshness of voice, the growth and development of the genital organs, growth of bones and enlargement of muscles. Fig. (2)

The testes are enclosed inside a sac is known as scrotum outside the body hanging between the thighs. Its function is to regulate and preserve the temperature of the testes two degrees below the normal temperature of the inside f the body, which is the optimum temperature for the growth and development of sperms.

Enrichment information (1)

The testes of the elephant are present inside the body cavity. That's why it is surrounded by some cooling system that preserves the optimum temperature for the testes to function efficiently and produce healthy sperms.

Exercise (1)

What do you expect to happen if the testes where present inside the body and didn't come out during the development of the embryo?

2 Vas deferens :

Attached to each testicle is a group of fine highly looped tubes known as the epididimis, where the sperms continue the final stages of growth and development and storage. The epididimis continues in the form of a long single tube known as the vas deferens. This tube helps transfer the sperms from the testes to the urethra.

Testis
Vas deferens
Epididymis
The connection of the vas deference
Fig. (3)

3 The associated glands:

Three kinds of glands are connected to the human male genital system, which are the seminal vesicles, the prostate and Cowper's glands Fig. (4). The secretions of these glands go with the sperms to form an alkaline fluid known as the seminal fluid. This fluid helps in neutralizing the acidity of the urethra, so that the sperms don't die during passing through it. It also contains a lot of nutrients that help nourishing the sperms and keep them alive and facilitates their flow.

Urinary bladder
Ureter
Seminal vesicle
Proastate gland
Cowper's gland
Urosexual opening
The associated gland to the genital system
Fig. (4)

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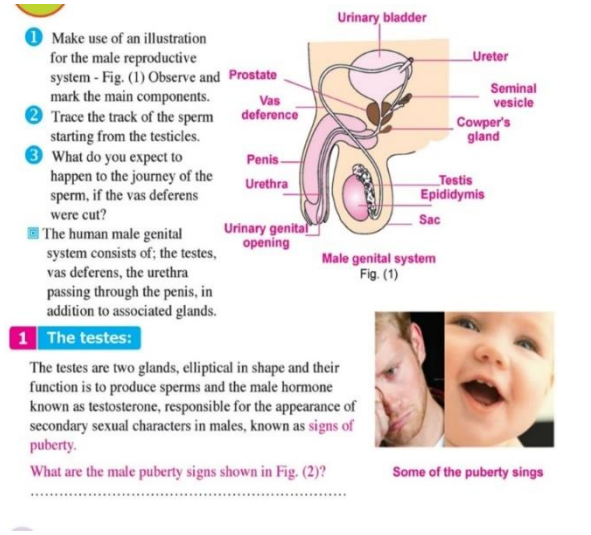


1 Make use of an illustration for the male reproductive system - Fig. (1) Observe and mark the main components.

2 Trace the track of the sperm starting from the testicles.

3 What do you expect to happen to the journey of the sperm, if the vas deferens were cut?

The human male genital system consists of; the testes, vas deferens, the urethra passing through the penis, in addition to associated glands.

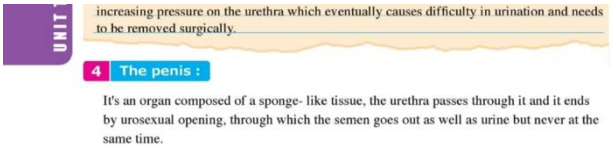
Urinary bladder
Ureter
Prostate
Vas deference
Seminal vesicle
Cowper's gland
Penis
Urethra
Testis
Epididymis
Sac
Urinary genital opening
Male genital system
Fig. (1)

1 The testes:

The testes are two glands, elliptical in shape and their function is to produce sperms and the male hormone known as testosterone, responsible for the appearance of secondary sexual characters in males, known as signs of puberty.

What are the male puberty signs shown in Fig. (2)?

Some of the puberty sings



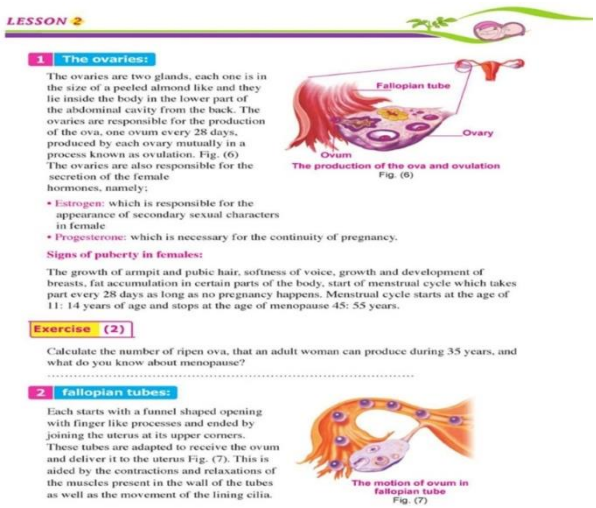
increasing pressure on the urethra which eventually causes difficulty in urination and needs to be removed surgically.

4 The penis :

It's an organ composed of a sponge- like tissue, the urethra passes through it and it ends by urosexual opening, through which the semen goes out as well as urine but never at the same time.

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.



LESSON 2

1 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. The ovaries are responsible for the production of the ova, one ovum every 28 days, produced by each ovary mutually in a process known as ovulation. Fig. (6)
The ovaries are also responsible for the secretion of the female hormones, namely:

- Estrogen: which is responsible for the appearance of secondary sexual characters in female
- Progesterone: which is necessary for the continuity of pregnancy.

Fallopian tube
Ovary
Ovum
The production of the ova and ovulation
Fig. (6)

Signs of puberty in females:

The growth of armpit and pubic hair, softness of voice, growth and development of breasts, fat accumulation in certain parts of the body, start of menstrual cycle which takes part every 28 days as long as no pregnancy happens. Menstrual cycle starts at the age of 11: 14 years of age and stops at the age of menopause 45: 55 years.

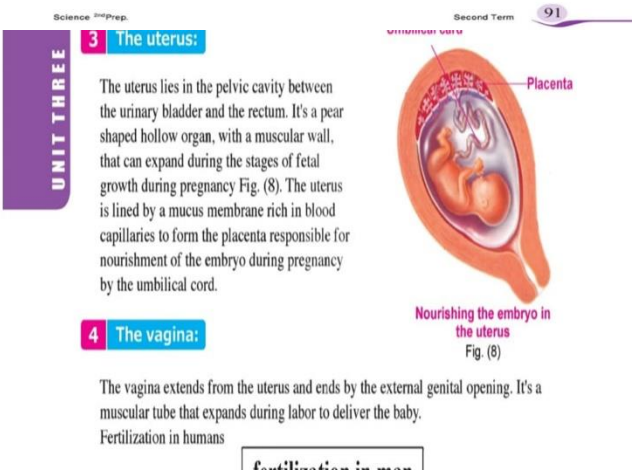
Exercise (2)

Calculate the number of ripen ova, that an adult woman can produce during 35 years, and what do you know about menopause?

2 fallopian tubes:

Each starts with a funnel shaped opening with finger like processes and ended by joining the uterus at its upper corners. These tubes are adapted to receive the ovum and deliver it to the uterus Fig. (7). This is aided by the contractions and relaxations of the muscles present in the wall of the tubes as well as the movement of the lining cilia.

The motion of ovum in fallopian tube
Fig. (7)



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UNIT THREE

3 The uterus:

The uterus lies in the pelvic cavity between the urinary bladder and the rectum. It's a pear shaped hollow organ, with a muscular wall, that can expand during the stages of fetal growth during pregnancy Fig. (8). The uterus is lined by a mucus membrane rich in blood capillaries to form the placenta responsible for nourishment of the embryo during pregnancy by the umbilical cord.

Placenta
Nourishing the embryo in the uterus
Fig. (8)

4 The vagina:

The vagina extends from the uterus and ends by the external genital opening. It's a muscular tube that expands during labor to deliver the baby.

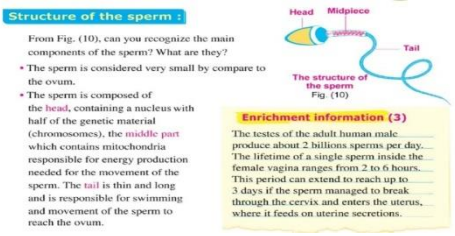
Fertilization in humans

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



Structure of the sperm :

From Fig. (10), can you recognize the main components of the sperm? What are they?

- The sperm is considered very small by compare to the ovum.
- The sperm is composed of the head, containing a nucleus with half of the genetic material (chromosomes), the middle part which contains mitochondria responsible for energy production needed for the movement of the sperm. The tail is thin and long and is responsible for swimming and movement of the sperm to reach the ovum.

Head Midpiece Tail

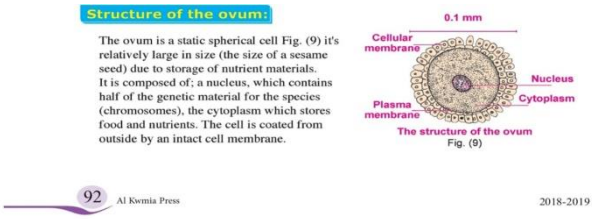
The structure of the sperm
Fig. (10)

Enrichment information (3)

The testes of the adult human male produce about 2 billions sperms per day. The lifetime of a single sperm inside the female vagina ranges from 2 to 6 hours. This period can extend to reach up to 3 days if the sperm managed to break through the cervix and enters the uterus, where it feeds on uterine secretions.

Objective 7: Describe the structure of the ovum.

–Yes, this objective has been achieved, for



Structure of the ovum:

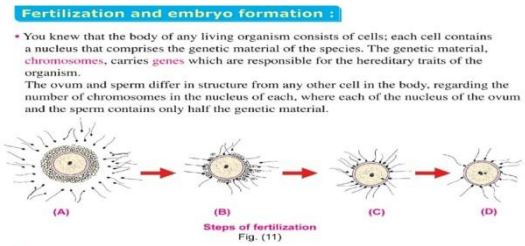
The ovum is a static spherical cell Fig. (9) it's relatively large in size (the size of a sesame seed) due to storage of nutrient materials. It is composed of; a nucleus, which contains half of the genetic material for the species (chromosomes), the cytoplasm which stores food and nutrients. The cell is coated from outside by an intact cell membrane.

0.1 mm
Cellular membrane
Nucleus
Cytoplasm
Plasma membrane

The structure of the ovum
Fig. (9)

Objective 8: Conclude the concept of fertilization in humans.

–Yes, this objective has been achieved, for



Fertilization and embryo formation :

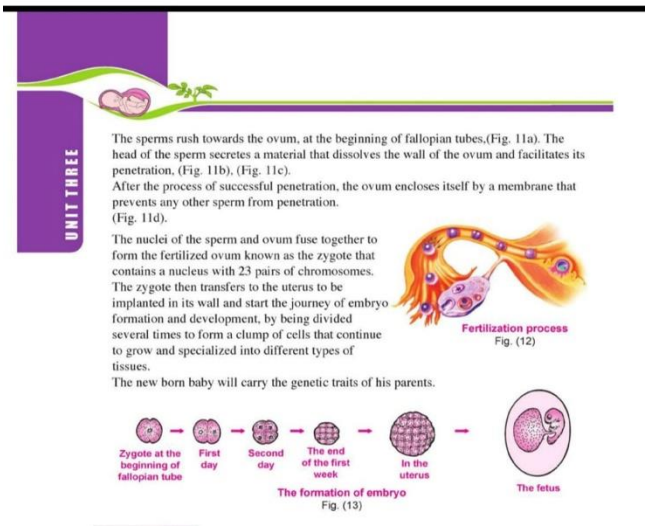
- You knew that the body of any living organism consists of cells; each cell contains a nucleus that comprises the genetic material of the species. The genetic material, chromosomes, carries genes which are responsible for the hereditary traits of the organism.

The ovum and sperm differ in structure from any other cell in the body, regarding the number of chromosomes in the nucleus of each, where each of the nucleus of the ovum and the sperm contains only half the genetic material.

(A) (B) (C) (D)

Steps of fertilization
Fig. (11)

- During mating, the male secretes billions of sperms, the move from the vagina to the uterus and then to fallopian tubes. On the other hand, the female produces only one ovum in the 14th day from the begining of menstruation.



UNIT THREE

The sperms rush towards the ovum, at the beginning of fallopian tubes,(Fig. 11a). The head of the sperm secretes a material that dissolves the wall of the ovum and facilitates its penetration, (Fig. 11b), (Fig. 11c).

After the process of successful penetration, the ovum encloses itself by a membrane that prevents any other sperm from penetration. (Fig. 11d).

The nuclei of the sperm and ovum fuse together to form the fertilized ovum known as the zygote that contains a nucleus with 23 pairs of chromosomes. The zygote then transfers to the uterus to be implanted in its wall and start the journey of embryo formation and development, by being divided several times to form a clump of cells that continue to grow and specialized into different types of tissues.

Fertilization process
Fig. (12)

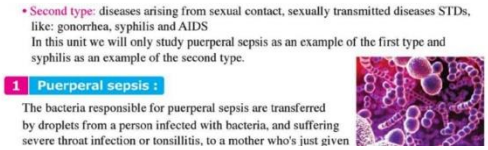
The new born baby will carry the genetic traits of his parents.

Zygote at the beginning of fallopian tube → First day → Second day → The end of the first week → In the uterus → The fetus

The formation of embryo
Fig. (13)

Objective 9: Recognize some sexually transmitted diseases

–Yes, this objective has been achieved, for

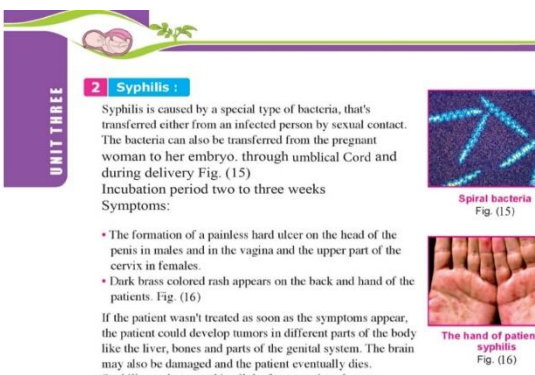


- Second type: diseases arising from sexual contact, sexually transmitted diseases STDs, like: gonorrhea, syphilis and AIDS

In this unit we will only study puerperal sepsis as an example of the first type and syphilis as an example of the second type.

1 Puerperal sepsis :

The bacteria responsible for puerperal sepsis are transferred by droplets from a person infected with bacteria, and suffering severe throat infection or tonsillitis, to a mother who's just given



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2 Syphilis :

Syphilis is caused by a special type of bacteria, that's transferred either from an infected person by sexual contact. The bacteria can also be transferred from the pregnant woman to her embryo. through umblical Cord and during delivery Fig. (15)

Incubation period two to three weeks

Symptoms:

- The formation of a painless hard ulcer on the head of the penis in males and in the vagina and the upper part of the cervix in females.
- Dark brass colored rash appears on the back and hand of the patients. Fig. (16)

If the patient wasn't treated as soon as the symptoms appear, the patient could develop tumors in different parts of the body like the liver, bones and parts of the genital system. The brain may also be damaged and the patient eventually dies. Syphilis can be treated in all the fore-mentioned stages.

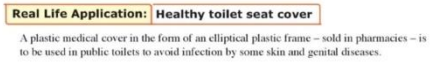
How Can we prevent the disease

Spiral bacteria
Fig. (15)

The hand of patient of syphilis
Fig. (16)

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.

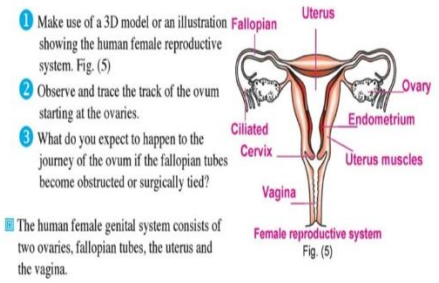
→ Fertilization in human: Sperm and egg unite in one of the fallopian tubes (zygote).

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:



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 (1):

Unit	Lesson	Comment
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

weighted mean	attitude
from 1.00 to 1.66	disagree
from 1.67 to 2.33	neutral
from 2.34 to 3.00	agree

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.

Objectives	Weighted mean	General trend
Determine the chemical and natural properties of water.	1.8	neutral
Explain the irregularity of the natural properties of water.	1.8	neutral
Recognize the electrolysis of water.	1.8	neutral
Describe the chemical bonds among the atoms and molecules of water (covalent and hydrogen).	2.7	agree
Determine water pollutants and their bad effects.	2.6	agree
Recognize the principles of elements.	2.8	agree
classification in the modern periodic table.	2.8	agree
Estimate scientists efforts in discovering, classifying and investing elements.	2.8	agree
Determine the location and properties of some elements in the modern periodic table by recognizing their atomic numbers.	2.4	agree
Recognize of halogens.	2.8	agree
Describe elements properties and their uses.	2.4	agree
Use tools, materials and instruments in studying elements properties.	2.4	agree
Follow the efforts and attempts of some scientists to classify elements (Mendleev – Moseley – Modern Periodic Table).	2.6	agree
Recognize the principles of elements classification in the modern periodic table.	2.6	agree

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.

Objectives	Weighted mean	General trend
Describe the structure of the bisexual, male and female flowers.	1.8	neutral
Describe the structure of the bisexual, male and female flowers.	2.6	agree
Describe the structure of the bisexual, male and female flowers.	2.5	agree
Identify the functions of the calyx, corolla androecium and gynoecium.	2.8	agree
Identify the functions of the calyx, corolla androecium and gynoecium.	2.5	agree
Determine the sex of the flower.	2.4	agree
Describe the steps of sexual reproduction in plants.	2.7	agree
Describe the types of flower pollination.	2.6	agree
Deduce the concept of fertilization in plants.	2.1	neutral
Deduce the concept of fertilization in plants.	2.1	neutral
Identify the methods of mixed pollination.	2	neutral

Define asexual reproduction in plants.	**2.4**	**agree**
Define asexual reproduction in plants.	**2.4**	**agree**
Conclude the types of vegetative reproduction in plants.	**2.2**	**neutral**
Conclude the types of vegetative reproduction in plants.	**2.7**	**agree**
Recognize the structure of the genital system in human male.	**2.6**	**agree**
Recognize the structure of the genital system in human female.	**2.8**	**agree**
Conclude the function of the genital organs in human male.	**2.2**	**neutral**
Conclude the functions of the genital organs in human female.	**2.5**	**agree**
Compare between the functions of female and male genital organs.	**2.6**	**agree**
Describe the structure of the sperm.	**2.5**	**agree**
Describe the structure of the ovum.	**2.6**	**agree**
Conclude the concept of fertilization in humans.	**2.1**	**neutral**
Recognize some sexually transmitted diseases,	**2.2**	**neutral**
Recognize the different ways of preservation against sexually transmitted diseases.	**2.4**	**agree**

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.

Acknowledgement

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