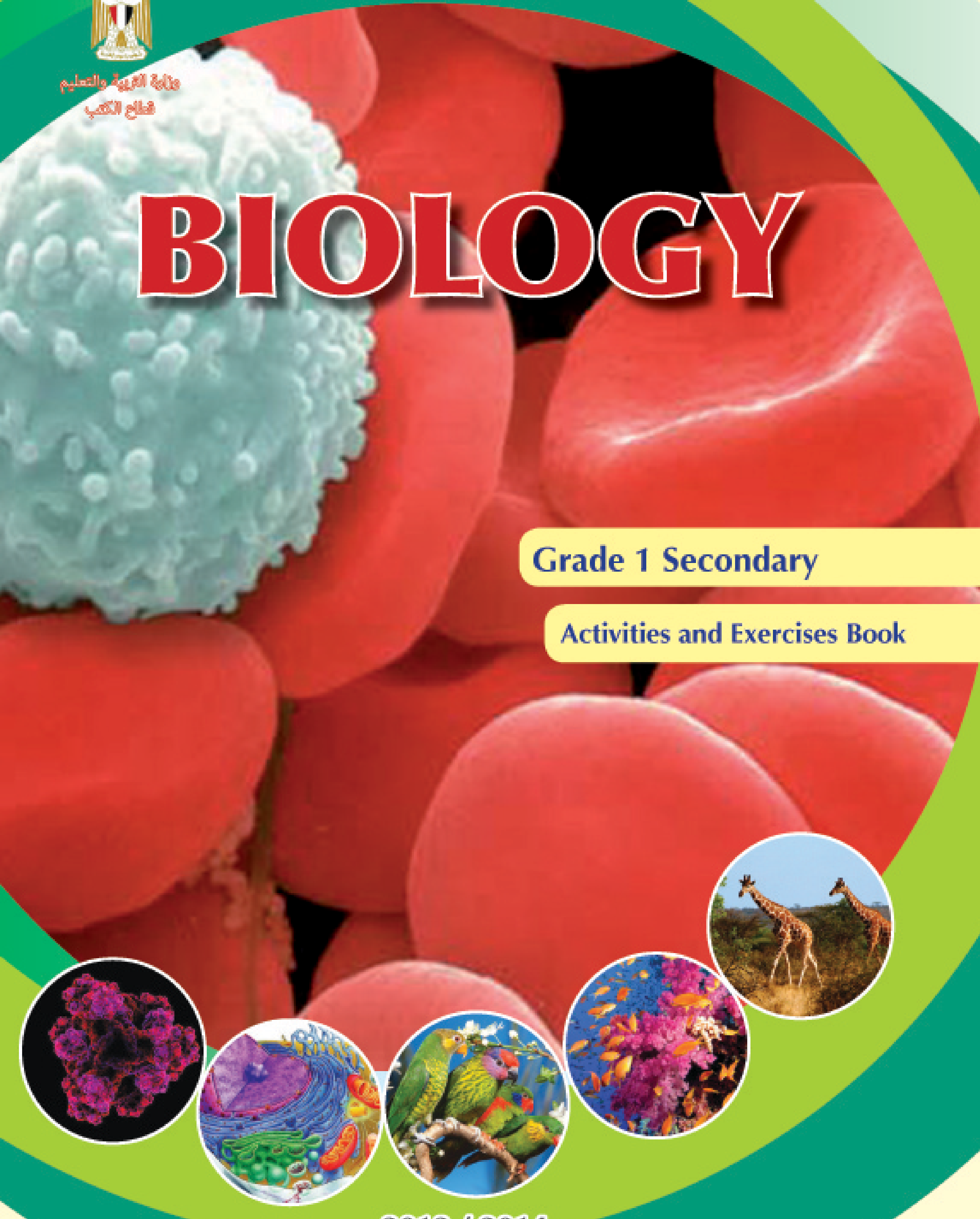
وزارة التربية والتعليم
قطاع الكتب

BIOLOGY



Grade 1 Secondary

Activities and Exercises Book

2013 / 2014

BIOLOGY

Name: ....

Class: ....

School: ....

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Activities and Exercises Book

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Introduction

Dear students:

Acquiring scientific knowledge in the field of biology requires you to follow the same steps followed by the scientists to obtain this knowledge. Therefore, laboratory activities are considered a key element in understanding biology where they provide various opportunities to deal with the surrounding biological phenomena throughout a number of skills including: questioning, prediction, hypotheses, specific and qualitative observation, classification, identifying and control variables, planning and performing experiments, collecting and interpreting data, conclusion, and finally communication.

Therefore, this activity book which is in your hands provides you with a number of laboratory experiments related to the topics that you study this year to help you deduce yourself the scientific knowledge throughout your activity and effectiveness. Furthermore, It also offers you practical activities that you can use in applying the knowledge that you gained and skills acquired to be able to deal with a number of issues and problems of life. Also, the book provides assessment activities to help you evaluate your knowledge and skills and improve learning and performance.

The book of activities and exercises has been divided into chapters and lessons corresponding to those in the Student's Book, and attached with five answered examination models to evaluate yourself-learning.

The book of activities and exercises is your way to practice many activities, develop the scientific skills and values. Carefully, record of all your own conclusions. The Student's Book and book of activities and exercises are complement to each other, however, they are not the only source of knowledge. You should consider other sources such as books, specialized scientific magazines and the international network for more information.

As we introduce you the book of activities and exercises, we hope the book be helpful to achieve your success, excellence and for more research and study in the field of biology .

Authors

Contents

Unit Three : Inheritance of Traits

Unit Four : Classification of living organisms

Unit Five : Biological evolution

Tools and devices in biology laboratory

Tools: Biology laboratory contains a group of various tools that is required for scientific experiment. From these tools the glasswares which include different types of flasks, measuring cylinders, test tubes, burettes, funnels, glass slides , droppers and so on . Also, other tools in laboratory biology are the dissecting tools including dissecting pans, scalpels, forcepses, scissors , and pins**.**

Cleaning the glasswares: All the glasswares used in experiments must be leaned directly after finishing experiments by water and soap in the washing basin. If necessary, chromic acid can be used to remove solids that stick to the tubes. Glass wares can be rinsed by water before washing with on organic solvent like acetone to remove the remains of any organic substances **.**

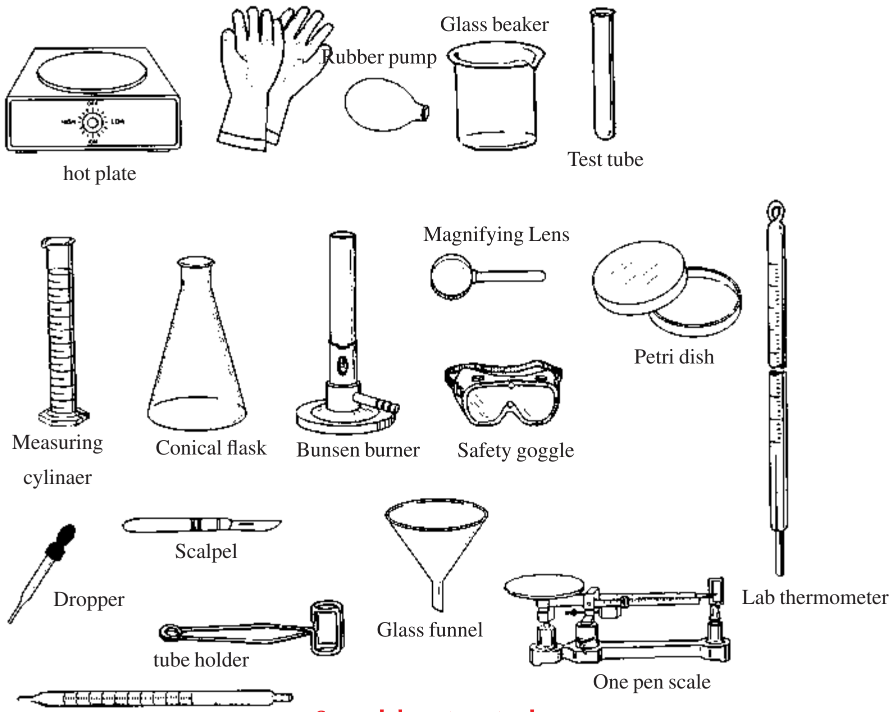
Devices: Include different types of microscopes, scales, incubators, autoclaves, centrifuges, pH meters, and others**.**

Thermometers and pH meters

Incubator

Digital scale

Compound light microscope



Some laboratory tools

Safety precautions in biology laboratory

First : General rules :

1. Remember that, the laboratory is a place for the scientific aimed hard work.
2. Lab coat and gloves should be always worn, and the goggles if necessary.
3. Tie back long hair, and secure any loose - fitting clothing.
4. Never eat or drink in the laboratory.
5. Clean the workbench with a suitable cleaner before and after working.
6. Microscopes should be carried and handled carefully.
7. When you use microscope, clean the lenses and mirrors before using by soft paper towels. Start examination with the low objective lens.
8. When you finish using microscope, make sure that the low objective lens in a vertical position, then put the microscope inside its box and return it into its place.
9. Dissecting tools must be used carefully, and cleaned well after using.
10. Cupboards, drawers and doors must be kept closed . Also, the lanes must be cleaned and are free of obstacles.
11. In Case of spilling some substances, floor must be cleaned in order to prevent sliding.
12. Follow the recommended instructions to get rid of trash according to its kind.
13. Don't through out match sticks while it on fire in order not to cause any fire.
14. When you handling chemicals, you should pay attention for the label written on each bottle, and be sure the name of each substance.
15. Never smell or taste any chemicals and don't touch any bootle containing chemical unless instructed to do so by your teachers, most chemicals are dangerous and toxic.
16. When heating a test tube, heat it at its side, not at its bottom. Move the tube over the flame to distribute heat regularly, and always point its mouth away from yourself and others.
17. If you spilled any chemical on your body, tell your teacher or lab supervisor immediately and get rid of it in a suitable way.
18. Be sure that water taps (faucets) , gas outlets are turned off before leaving the lab.

Second : Rules of scientific activities:

1. Read through the procedure of the activity, and understand well before you start working, and follow what is required from you accurately.
2. Follow the safety guidelines shown in the activity.
3. Check the materials and tools that required to make sure its validity before working.
4. Cooperate with your colleagues and keep calm during working.
5. Record all results you get accurately and honesty.
6. Show your teacher all your results, and share your colleagues all you have reached.
7. Clean your workbench, tools and devices that you used , and organize it in their specified places after using.
8. Wash your hand well with water and soap after each activity inside the lab.

First aid

Outline of the steps that should be followed when some injuries happen inside the lab :

The injury	How to deal with it
Acid burns	Keep the injured part under cold water for a continuous period, then use bicarbonate compresses.
Fainting	Placing the person in fresh air, and keeping his head in a sloped position so it is at a lower level than the rest of his body.
Fire	Turning of all gas outlets, pulling out electrical connections, using a fireproof blankets, and asking for the assistance of fire men for extinguishing the fire.
Eye injury	Washing the eye immediately with water and taking care not to rub the eye if there is any starngs thing inside it so that scratches do not occur in the cornea.
Simple incisions	Bleeding should be stopped using dessings, incision must be cleaned using iodine solution or alcohol and wrapping it with a sterilized dressing.
Poisoning	Washing mouth throuly with water, drinking an amount of milk if the substance was acidic but if it was alkaline, the injured should drink diluted vinegar solution or lemon.

Compound light microscope

Compound light microscope is considered as one of the major tools in biology lab. It is an accurate and sensitive device which should be used carefully.

First : Structure of compound light microscope:

The compound light microscope consists of the following parts:

A–Mechanical parts

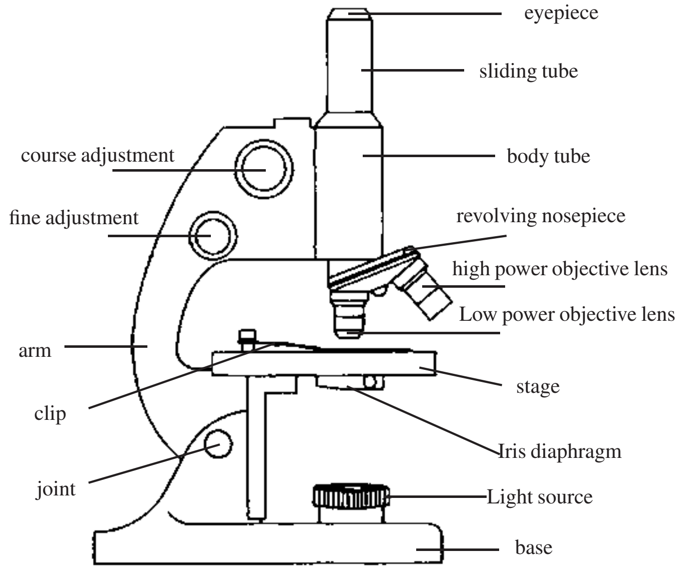
1 Base: is the inferior part that the microscope rests on.

2 Arm: is used for carrying the microscope

3 Stage: is the surface on which the slides to be examined are placed. There is a small hole at its center allowing light to pass through the slide.

4 Body tube: is a cylindrical tube with an eyepiece at its upper end to look through during examination.

5 Revolving Nose Piece: is a circular part attached with the lower part of the tube and used to change the positions of objective lenses fixed in it



Compound light microscope

6 Coarse adjustment: is a big knob located on both sides of the microscope used to adjust the distance between the stage and objective lens to get clear vision, it is used when low power objective lens (4x) or medium objective power lens (10x) is used . It isn't used with the higher power objectives lens (40 x) and oil immersion objective lens(100 x).

7 Fine adjustment: is a small knob located also on both sides of microscope. It is used to assist in viewing the target clearly. The fine adjustment is used with the high power objective lens (40x) or the oil immersion objective lens (100x).

8 Clip: There are 2 lips fixed at their ends on the stage and used to hold slides on the stage.

B - Optic parts:

1 Mirror or Illuminator: The function of mirror is the reflecting and directing light rays from an external sourse towards the objective lens through the slide to be magnified. The mirror has two surfaces, one is plane while the other is concave, that is to control the density of reflected light. In more developed microscopes, the mirror is replaced by a constant light source called the illuminator.

2 Objective lenses: a group of 3-4 lenses attached to a disc. They almost always consit of 4x, 10x, 40x and 100x . When coupled with eye piece lens or ocular lens (always 10x), the total magnification powers are 40x (4x times 10x), 100x, 400x and 1000x) , respectively.

3 Ocular lens (eye piece lens) : is the lens that we can look through it . It is placed at the top of the sliding tube of the microscope. The magnifying power of this lens is always written on it, usually ten times (10x).

4 Iris diaphragm: it is located under the stage , by which we can control the amount of light passes through the slide to the objective lens.

5 Condenser: it is located under the hole of the stage. Its function is to focus light onto the specimen on the glass slide.

Second : How to use the compound light microscope:

Follow the follwing procedure each time you use microscope:

1 Catch the microscope carefully by holding its arm with one of your hands, and place the other under its base. Then , place it on the table so you can look through the ocular lens easily .

2 Clean the lenses, if necessary, using the specified tissue of cleaning lenses. Don't touch lenses with your fingers and don't wipe it with normal tissues .

3 Define the direction of the light source, then adjust the mirror till the viewing area becomes more visible. Don't expose the mirror to direct sunlight as a source of light, because this harms your eyes. Use the flat mirror during daylight, and the concave one with the dim light source when using the high power objective lens. If the microscope is supplied with an electrical illuminator , adject light level to be comfortable for your eyes .

4 Rotate the nosepiece to the low power objective lens leaving distance (2- 3cm) between it and stage.

5 Place a microscope slide on the stage, and be sure its coverslipe at its upper side, as well as the specimen to be examined is placed in path of light that comes from the mirror through the iris diaphragm. Set the slide under the stage 2 metal clips .

6 Use the course adjustment to get the low power objective lens closer to the slide while you are looking at it, not through the ocular lens .

7 Look through the ocular lens and move the sliding tube slowly upward using the course adjustment till the image appears clear, then use the fine adjustment till the image becomes more clear and sharp .

8 If you would like to magnify the image more, rotate the high power objective lens to replace the low power one , then use the fine adjustment to make the image more clearer and sharper .

9 After you finish using microscope cover it , with keeping the low power objective lens coupled with the ocular lens. Make sure that you don't leave the slide on the microscope stage .

Some process skills in studying biology

It is known that science is not simply a set of facts, rules and theories, but it is a codified way for collecting and organizing information about the mature and universe. These information are acquired via a set of skills, such as : observing , testing, analyzing , concluding...etc., or in other words, studying the information (data) with an ordered and organized way. These information are not hidden for anyone or difficult to practice, you practice and use many of them daily .

Observation: it is the most easiest and important way for data collecting about something in nature. When you observe, you use one or more of your senses to collect data about what surrounds you, such as : vision, touching, tasting, smelling or hearing . However, your ability of observing increases when you use some tools, such as : microscope, thermometer and other measuring tools.

Predication : When you predict, you decide what you expect to happen in the future. Predictions are based on the previous experiences and observations, so you can predict what may occur. In order to ensure that your prediction is correct, you must carry out a test.

Hypothesizing: when you formulate a hypothesis, you decide one of the possible explanations for occurrence of an event. This hypothesis you have formulated does not come from none , but it is based on information or data that you are previously know.

You can ensure validity of the hypothesis by observation or testing. You observations or your experiments result must come in agreement with your hypotheses and supporting them in order to grantee that they are valid. But if they are incompatible , you must revise what you have assumed once again, or provide another hypotheses.

Testing hypotheses correctness/ Designing experiments: From the best ways of the practical study of biology is the test by the controlled experiments. What scientists do when they test a hypothesis? What you are going to test your hypotheses? The correct answer for these two questions is the accurate planning to carry out a group of practical activities or experiments in order to:

- Observe certain factor which may be the reason a something to happen.
- Test the validity of the idea or expectation.
- Reach to a correct or convincing answer regarding the something in question.
- Most experiments must be controlled . In the controlled experiments,

there are two groups, one of them is known as experimental group, and the other is called the control group. Cotrol group is a standard experiment by which any change in the experimental group can be measured. But in the experimental group , all the factors in the control experiment are the same except the factor to be tested and which is known as the experimental variable .

Recording and organizing data: you must record all observations and measurements obtained during carrying out experiments. After this step, organize data that you have recorded in the form of tables, cards, graphs, or diagrams.

Analyzing and explaining data: once data were recorded and organized , you must study it by analysis and explanation in order to verify its compatibility with your expectation or hypothesizing , so you can make sure of its correctness, or revising to modify it , or to propose another hypothesis.

Conclusion: It comes at the end based on what resulted from the experiments . It includes a solution of the problem under study..

Safety symbols

The following are the safety symbols which should be followed during carrying out the practical experiments

- **Review these symbols when they appear in each activity**

 Eye safety:

Wear your laboratory safety goggles when you are working with chemicals, open flame, or any substances that may be harmful to eyes.

Wash your eyes well with a plenty of water if a chemical get into one of your eyes or both, then tell your teacher.

 Skin and clothes safety:

Wear laborator coat. It will protect your skin and clothes from stains and chemicals.

 Glassware safety:

- Check glassware you use from cracks.
- Do not force rubber stoppers into glass tubes and follow your teacher's instructions.
- Clean all glasswares. It is better to dry them in air rather than drying them with tissues.

 Sharp object safety:

- Be careful when using knives, scalpels, or scissors.
- Always cut in the direction away from your body and from others.
- Tell your teacher immediately if you or one of your colleagues is cut.

 Heating safety:

- Use the proper procedure when lighting a bunzen burner.
- To avoid burns, do not handle heated glasswares or materials directly. Use tongs, test tube holders,

or heat - resistant gloves.

- For heating , use glassware that tolerate heat.
- When heating flasks and beakers, use a ring- stand setup with a wire gauze.
- When heating with busen burner, gently move the test tube over the hottest part of the flame.
- Don't pour hot liquids into plastic containers.

Fire safety:

- (For girls) Tie your back long hair and roll up long sleeves when working near an open flame. Confine loose clothing.
- Don not reach across an open flame.
- Know the location and proper use of fire blankets and fire extinguishers.

Electrical safety

- Be careful when using electrical equipments
- Check all electrical equipment for worn wires or loose plugs before using.
- Keep your area dry.
- Don't overload electric circuits.

Poison safety:

- Don't mix any chemicals unless directed to do so in a procedure or by your teacher.
- Tell your teacher immediately if you spill chemicals or get any chemicals on your skin or in your eyes.
- Never taste any chemicals or substances unless directed to do so by your teacher.
- Keep your hands away from your face when working with chemicals .
- Wash your hands with soap and water after handling chemicals.

Animal Safety:

- Handle live animals with care. If you are bitten or scratched by an animal.
- Don't bring wild animals into the classroom.
- Don't cause pain, discomfort, or injury to an animal.
- Be sure any animals kept for observations are given the proper food, water, and living space.
- Wear gloves when handling live animals. Always wash your hands with soap and water after handling live animals.

Plant safety:

- Use caution when collecting or handling plants.
- Don't eat or taste unfamiliar plants or plant parts.
- Wash your hands with soap and water after handling plants.
- If you are allergic to pollen, don't work with plants or plant parts without using a gauze face mask.

Unit One

Chemical basis of life

Chapter 1: Chemical structure of living organisms' bodies (carbohydrates and lipids)

Chapter 2: Chemical structure of living organisms' bodies (proteins and nucleic acids)

Chapter 3: Water

Chapter 4: Chemical reactions in living organisms' bodies.

Practical activity

Detection of sugar

Safety precautions

Activity goal

Reveal the presence of sugar in different food samples using the blue Benedict's reagent (turns orange in presence of simple sugars)

Acquired skills

Hypothesizing, experimenting, concluding, observing, interpreting

Materials needed

Water bath, burner, 4 test tubes, tube rack, glucose solution, starch solution, egg albumin, distilled water, Benedict's reagent, pen, tube handler.

Share your group in this activity.

Procedure:

Hypothesizing:

In light of the goal of this activity, which substance (s) you have contain a monosaccharide? ....

Test the validity of your hypothesis:

1 Label test tubes 1 - 4 .

2 Put 2 ml of glucose solution, starch solution, egg albumin, and distilled water, respectively in the tubes .

3 Add 2 ml Benedict's reagent to each tube.

4 Leave the tubes in water bath for 5 minutes.

5 Write down your observations in the opposite tabel:

Tube number	Substance	The resulted colour
1	Glucose solution	....
2	Starch solution	....
3	Egg albumin	....
4	Distilled water	....

Conclusion:

- Which tube (s) give positive results (turns to orange) and which is negative (colour is not changed)? ....
- What is the relation of your results with your hypotheses? ....
- What do you conclude from the experiment? ....
- Does the starch colour change by adding Benedict's reagent? Why? ....
....
- Which of the previous substances must be avoided by diabetic and obese pacients ? ....
- How can Benedict's reagent be used in the different situations of actual life? ....

Applied activity

Combating obesity

Sefety precaution

Activity goal

- Use your skills in detecting the presence of starch in some foods you are taking by using iodine solution (iodine turns blue in presence of starch)
- Foods are classified depending on their starches content.
- Write a report about the foods that should be minimized for obese patients.

Acquired skills

Experimenting, observing, inferring, explaining, classifying

Materials needed

Samples of foods: Milk powder, pea seeds, soybean grains, sucrose sugar, green apple, tomatoes, carrots, celery, macaroni, bread, iodine solution and a dropper .

You are invited to participate in a class about awareness against obesity. Write a report showing what must be taken by obese patients, and what must not be taken. Support your opinion with the result of your experiment. View the report to your colleagues.

Procedure:

By using iodine solution, detect the presence of starch in samples you have.

Note: Some materials such as: Soybeans, macaroni and wheat needs grinding.

Observation:

Design a table to write down the change in iodine colour in each case.

Classifying:

In a table, classify the foods you tested into 2 categories according to their content of starch ....

Practical activity

Detecting lipids

Safety precautions

Activity goal

Detect the presence of lipids in different samples of foods using sudan - 3 reagent (a stain soluble in fats and turns red in presence of fats))

Acquired skills

Hypothesizing, experimenting, concluding, observing, explaining

Materials needed

Sudan-4 stain, potatoes, bean seeds, castor seeds, distilled water, 4 pipettes, adhesive paper, mortar and 4 test tubes

Participate your group in this activity.

Procedure:

Hypothesizing:

In light of this activity goal, which substance (s) you have contain lipids?

....

....

....

Test the validity of your hypothesis:

1 Cut a small piese of potato, then cut it into smaller pieces. Put the pieces in a mortor and grind. If you need, you can add 2ml of distilled water to facilitate grinding. Collect the resulted juice in a test tube and label potato juice.

2 Using another mortar, grind bean seeds, and repeat the previous step with peanut seeds. You can add 2 ml distilled water for each.

3 In a test tube, put 2 ml of what resulted from bean seeds grinding. In another tube, put 2ml of what resulted from peanut seeds grinding. In a third tube put 2ml distilled water.

4 Add 2ml of sudan -4 stain to each tube.

Write down your observations in the table:

No	Substance	The resulted colour
1	Potato	
2	Bean seeds	
3	Peanut seeds	
4	Distilled water	

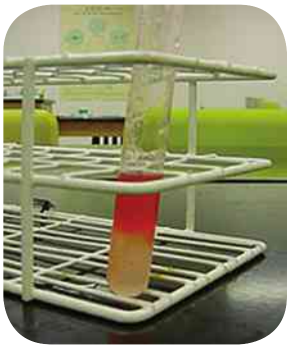
Conclusion:

- Which substance (s) tested contain fats? What is the relation of your results with your hypothesis? ....

....

- How can sudan-4 indicator be used in the actual life situations?

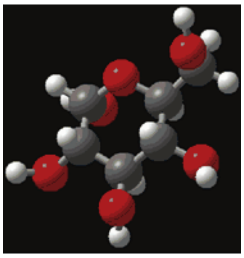
....



Applied activity

Making models

- Participate your colleague to make a model using raw material of environment for each of the following to show its molecular structure:
- a simple sugar (mono - or disaccharide) - starch
- Explain to your colleagues the relation among the model you designed and its molecular structure.



Assessment activity

Solve the following problem:

Your colleague know that starch consists of glucose molecules. He used Bendict's reagent for detecting glucose in a sample of white flour, but the result was negative.

1 Why doesn't reagent colour turn to orange?

....

....

2 If you know that partially digestion of starchy substances into sugary ones starts in mouth by salivary amylase. What is the procedure that your colleague must be carried out before detecting glucose?

....

....

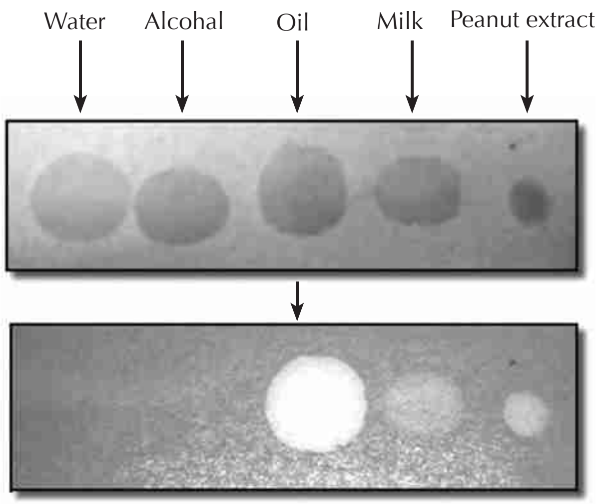
3 Can iodine solution be used for detecting starch in a well chewed piece of bread? Why?..

The following figure illustrates results of an experiment, in which sudan -4 stain was added (a stain soluble in fats that make a greasy spot on the shown substances).

- **Arrange these substances according to their fat content**

....

....



Practical activity

Detection of proteins

Safety precautions

Activity goal

Detect the presence of protein using biuret reagent (blue turns to violet in presence of protein))

Acquired skills

Predicting, experimenting, observing, explaining

materials needed

Biuret reagent, egg albumin , starch solution, sucrose solution, distilled water, and 4 test tubes

Procedure:

1. Predict: which substance (s) you have contain protein?
2. Label test tubes 1 - 4 .
3. Put 2ml of egg albumin solution, starch solution, sucrose solution and distilled water, respectively, in the 4 tubes
4. Add 2ml biuret reagent to each tube.

	Substance	Observation
1	Egg albumin	....
2	Starch solution	....
3	Sucrose solution	....
4	Distilled water	....

Record your observations in the table above:

Conclusion and analysis:

- Which substance (s) gave positive results? Which is negative?

....

....

- Compare between your observations and predictions.

....

....

- What do you conclude from this experiment?

....

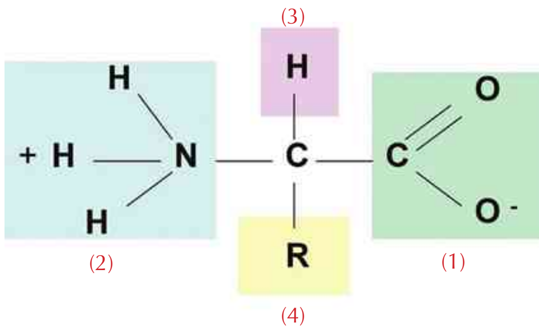
- What are the actual life situations in which biuret reagent can be used?

....

....

Assessment activity

1 The following figure represents the general formula of an amino acid. Examine the figure, then answer the following questions:



- Identify what the numbers 1-4 represent.

....

- What are the numbers that represent the functional groups in the amino acid?

....

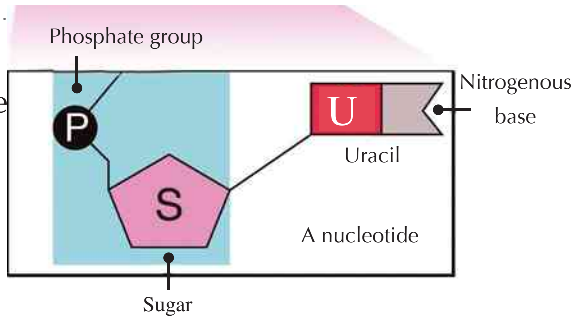
- Which of the previous is differ from an amino acid to another?

....

....

....

2 The nucleotide in opposite figure represents the building unit of:



a - DNA
b - RNA
c- DNA and RNA

Justify your answer: ....

....

....

3 Use the following table to compare between DNA and RNA :

Comparison points	DNA	RNA
Type of sugar		
No. of strands		
Nitrogenous bases		
Importance		
Site		

Practical activity

Surface tension of water

Participate your group in this activity.

Safety precautions

Activity goal

Reveal the importance of surface tension of water

Acquired skills

Experimenting, observing, Inferring, explaining

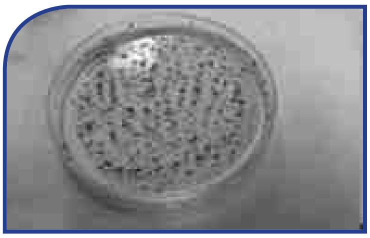
Materials needed

A petri dish, ground pepper, liquid soap, and dropper

Procedure:

1. Put little water in petri dish.
2. Disperse black pepper on water surface.
3. By the dropper, add a drop of liquid soap at middle of the dish. Observe the movement of pepper in the dish.

At beginning of experiment



Before adding liquid soap

After adding liquid soap

Record your observations:

Discuss and explain:

- Does surface tension of water change after adding the soap? What is you evidence (s)?

- How can you explain the movement of pepper in light of the previous experiment?

Assessment activity

Water Water and soap mixture

1 **In the opposite figure**:

Two similar cotton balls, one of them was placed in a jar contains tap water and the other was placed in similar jar contains the same amount of a mixture of water and soap.

Observe:

- What is the ball that fell more into the bottom?

....

- If you know that the dropping of water surface tension makes water more able to penetrate tissues. Which one of the two cases shows less surface tension of water ?

....

....

....

....

- Explain this phenomenon? Identify some of its life applications.

....

....

....

....

Practical activity

Water rising inside capillary tubes

Safety precautions

Activity goal

Investigating the importance of water rising inside capillary tubes

Acquired skills

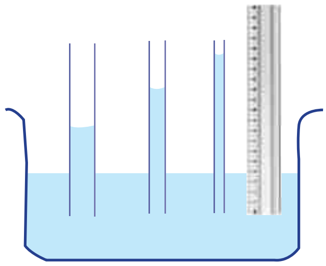
Experimenting, observing, inferring, explaining,

Materials needed

Water basin - 3 tubes of different diameters .

Procedure:

1 Put 3 open ended tubes of different diameters vertically in the water basin.



2 Stand a white paper behind the tubes .

3 Describe the height of water inside the tubes.

4 Measure water height inside the tubes using a metric ruler, and record your data.

Tube no.	Hight
1	
2	
3	

Discuss and explain

1 Why is water height differed inside the tubes?

2 How can living organisms benefit from this property of water?

Practical activity

Effect of temperature on enzyme activity

Safety precautions

Activity goal

Investigate the effect of temperature on the activity of an enzyme

Acquired skills

Experimenting, observing, inferring, explaining

Materials needed

3 equal - sized pieces of fresh liver, 3 flasks, boiling water, hydrogen peroxide, and glowing splint

Catalaze enzyme that exists in plant and animal tissues catalyses the decomposition of hydrogen peroxide in body cells in order to get rid of it because it is a toxic substance. This produces water and oxygen gas.

Procedure:

1. Put 25 ml hydrogen peroxide solution in each flask.
2. In the first flask, put a small piece of fresh liver. In the second, put an equal - sized piece that previously placed in boiling water for 10 minutes. In the third one, put a similar piece of liver that already kept in freezer until frozen .
3. Wait several minutes, then record your observations.

Recording of observations:

- Are gas bubbles appear in the first flask? ....
- Are gas bubbles appear in the second flask? ....
- Are gas bubbles appear in the third flask? ....

Adjusting the variables:

- Identify the variable factor among the previous three cases ....
- What are the constant factors among the previous three cases?

....

....

- Identify the resulted gas: Test the resulted gas by approaching a glowing splint.

....

....

Conclusion :

- How does the temperature affect on the work of catalase?

....

....

Skills development: Designing experiments

Is catalayse can work once again when the frozen piece of liver was defrosted? Design an experiment to know that.

- Define the tools and materials you need:

 ....

Write down your steps:

 ....

 ....

 ....

Practical activity

Effect of pH on enzymes activity

Safety precautions

Activity goal

Inferring effect of pH on enzymes activity

Acquired skills

Observing, experimenting, inferring, predicting

Material needed

Amylase solution (5%), starch solution (5%), buffer solutions of different pH values, iodine solution, syringes (5 ml), test tubes, tubes rack, adhesive paper, pipette, stoping watch, and marking pen.

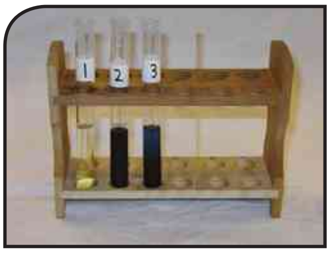
Share your group in this activity.

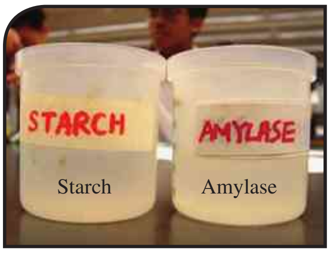
Amylase catalysis starch into simple sugars. In this experiment, you participate your group colleagues in determining the time taken by the enzyme for completing this process in the presence of a buffer solution which providing the desired pH value during the effect of pH on enzymes activity.

Notice: Buffer solution is that keeps the solution pH value constant at a certain value.

Procedure:

1. Start by using the buffer solution of pH = 7.5
This pH value is the optimal for activity of amylase. Use a syringe to put 2 ml amylase solution in a test tube, then add 1 ml buffer solution and 2ml starch solution, respectively. Carefully mix the tube contents well.
2. In another test tube, put 1 ml buffer solution (pH > 7), 2 ml amylase and 2 ml starch.
3. In a third test tube , put 1 ml buffer solution (pH < 7), 2 ml amylase and 2 ml starch.
4. Add to each of the three tubes equal number of similar drops of iodine solution. Observe the colouration of tubes with blue.





Starch
Amylase

Buffer salutions

5. Leave the tubes for a period of time. Record your observation in the following table:

Test tubes	Contents	pH value	Notes
1	Starch + iodine + amylase	7.5=pH	
2	Starch + iodine + amylase	7.5< pH	
3	Starch + iodine + amylase	7.5> pH	

- In which tube (s), the blue colour was changed? ....
- What is the tube (s) that represents the control experiment? ....
- Why starch is not affected by amylase in other tubes?

....

....

- Inffering: In light of your results, show how is enzyme activity affected by pH. ....

....

Practical activity

Determining pH value for several solutions

Safety precautions

Activity goal

Determine the pH value for a number of solutions

Acquired skills

Experimenting, observing, designing tables, recording data

Materials needed

Test tubes, several solutions (such as: vinegar, sodium hydroxide, distilled water, various juices), pH measuring paper, and electronic pH meter

Procedure:

1. Put equal amounts of solutions you have in test tubes.
2. Use pH measuring papers to determine pH value for each of them.
3. Repeat step 2 using the electronic pH meter.

Recording data: Record data in the following table.

Solutions	pH paper	pH meter
1		
2		
3		
4		
5		

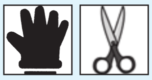
- Which of them is more accurate: using the pH papers or pH meter? Why?

....

....

Applied activity | **Use materials from the environment to make an indicator for measuring pH value**

Safety precautions



Activity goal

Use materials from the environment to prepare an indicator for measuring pH value

Acquired skills

Experimenting and comparing

Materials needed

Violet cabbage, water, burner, container, and cardboard .

Procedure:

1. Slice the cabbage
2. Put cabbage slices in a container. Add water till cover it and boil for half an hour
3. Liquidate the resulted juice in another container and leave it to cool.
4. Imerse the papers in the juice.
5. Leave the papers to dry.
6. Cut the papers into strands. Now, you have strands to measure pH value.
7. Use the strands in detecting an acidic solution (concentrated lemon juice).
8. Use the strands in detecting a basic solution (sodium carbonate)

- Compare between the results you obtained using the red cabbage leaves indicator and the standard colour scale device. (Student book, page 25).

....

....

Applied activity — **Project: measuring pH value for various samples of water**

Share your colleagues in this project.

Procedure:

1. Participate your group, with the help of your teacher, in collecting water samples from various regions in your environment.
2. Label the test tubes with water sources.
3. By the dropper, place 5 ml of water in each tube. Rinse the dropper well after each time or use a new dropper.
4. Determine pH value for each water sample using the standard colour scale.
5. Compare your results with the shape of the standard colour scale (student book, page 25).

....

6. Repeat the experiment using another indicator.

Safety precautions

Activity goal

- Determine pH value for various samples of water.
- Link between pH value and the source of water.

Acquired skills

Measuring acidity, analyzing data, posing scientific questions, experimenting, recording data.

Materials needed

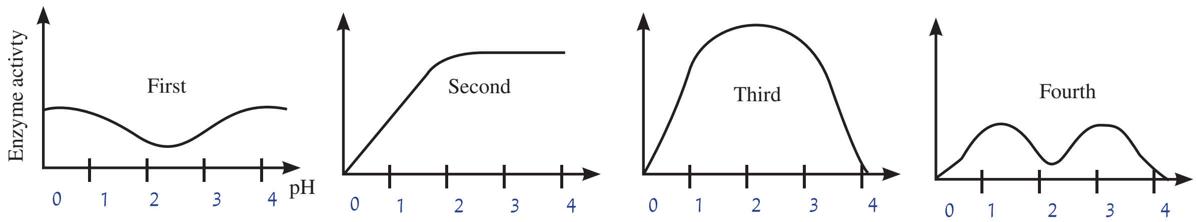
Water samples from different places (lake, sea, river, canal, tap water, rain water, distilled or filtered water), Test tubes, dropper or pipette, water for rinsing, bromo thymol blue indicator, standard colour scale for measuring pH, and tables of colours list.

Analysis and conclusion:

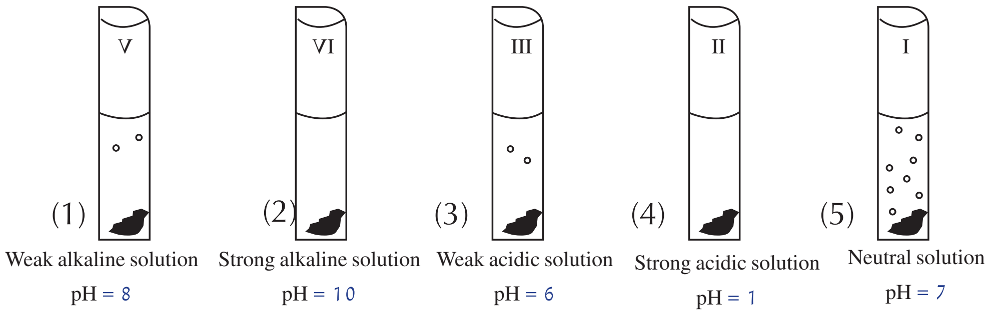
- Describe water samples that you have examined to determine pH value using the following terms: acidic, alkaline, and neutral ....
....
- What is the cause of difference in pH values of water samples from your point of view? ....
- How does the environment surrounding the source of water affect on its pH value? ....
- Identify the possible sources of error in measuring? ....
....

Assessment activity

1. Stomach secretes pepsin which helps in digestion in the stomach, works well at pH value ranging from 1.5 : 2.5. Which of the following figures shows what will occur to pepsin if pH value in stomach increased?



2. The following figure shows the results of an experiment in which a piece of fresh liver was placed in each of solutions of different pH values after adding of an enzyme.



- What is the name of enzyme? ....
- What is the optimal pH value of enzyme activity? ....
- What is the cause of the choice of a piece of fresh liver in carrying out of this experiment? ....

3. The following table shows the enzymes which work in different regions of the body and the appropriate pH value for each of them. Complete the table, then answer the following questions:

Location of enzyme	Enzyme	pH range	Type of medium
Mouth	Salivery amylase	7,5 - 7	....
Stomach	pepsin	2,5 - 1,5	....
Small intestine	pancreatic amylase, trypsin and lipase	8 - 7,5	....

- Predict the change in salivary amylase activity when it moves from the mouth to stomach. Explain your prediction. ....
- Predict the change in pepsin activity when it moves from the stomach to small intestine. ....

Unit One Exercises

First question: Multiple choice questions:

1. From examples of disaccharides:
A. Glucose B. Fructose C. Galactose D. Sucrose

2. Which of the following is not a polysaccharide?
A. Starch B. Glycogen C. Cellelose D. Sucrose

3. Which of the following is produced by reaction of fatty acids with alcohols.
A. Simple lipids B. Compound lipids C. Derived lipids D. Hormones

4. Liquid fats formed by reaction of unsaturated fatty acid with glycerol.
A. Oils B. Fats C. Waxes D. Cholesterol

5. Macromolecules contain hydrogen, oxygen, nitrogen, carbon and phosphorous.
A. Proteins B. Lipids C. Carbohydrates D. Nucleic acids

6. Building blocks of protein.
A. Fatty acids B. Amino acids C. Nucleic acids D. Glucose

7. Which of the following is not monomer?
A. Glucose molecule B. Amino acid C. A nucleotide D. Protein

8. Which of the following is not a function of proteins?
A. Maintainance and transmission of genetic information
B. Controlling the rate of reaction
C. Resistance of diseases
D. Movement of materials inside and outside cells

9. Which of the following statements is correct?
A. Simple sugar is composed of polysaccharide
B. Protein is composed of amino acids
C. Glycerol is composed of fatty acids
D. Nucleotides are composed of nucleic acids

10. How does the enzyme increase the speed of the chemical reaction?
A. By lowering the activation energy
B. By increasing the activation energy
C. By releasing energy
D. By absorbing energy

11. In the chemical reaction, the substrate bind with the enzyme at a region called the:
A. Promotor B. Resultant C. Target D. Active site

12. Which of the following biological molecules is consisted of glycerol and fatty acids?
A. Sugars B. Starch C. Lipids D. Nucleic acids

Second question: **Give reasons:**

1. The catalysis of protein albumin produces amino acids only.

....

....

2. There are millions of protein compounds despite that the number of amino acids is limited.

....

....

3. Some animals can maintain their temperature in severly cold places.

....

....

4. Sudan-4 stain is used in detecting lipids.

....

....

5. Monosaccharides are the responsible for the processes of energy transferring inside cells of living organisms.

....

....

Third question: **Compare between each of the following:**

1.

	Pentose sugar	Nitrogenous base
RNA	....	....
DNA	....	....

2

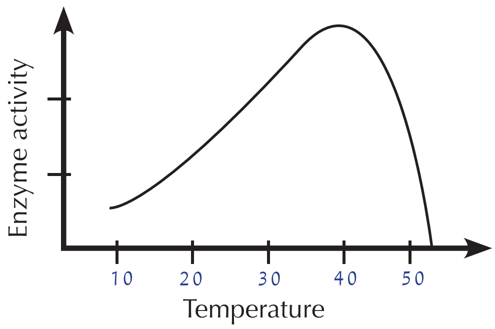
	Definition	Example
Simple sugars	....	....
Complex sugars	....	....

3

	Biological importance
Anabolism	....
Catabolism	....

Structural questions:

1 The following figure illustrates the relationship between the activity of an enzyme and temperature:



Temperature at which enzyme activity starts	....
Temperature at which the maximal enzyme activity appears	....
Temperature at which enzyme activity stops	....
The thermal range of enzyme activity.	....

Using results in above table, explain the effect of temperature on enzyme activity.

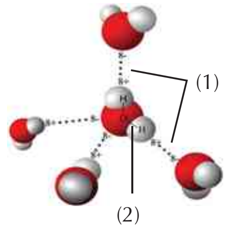
....

....

....

....

2 **The opposite figure illustrates the structure of water molecule?**



- No 1 represents .... bond that links between ....
- No 2 represents ....bond that links between ....

3 **Explain:**

- Water molecule is a polar molecule.

  ....

- Water is the best of solvents.

  ....

- In order to a substance dissolve in water, it must contains free ions, i.e it must be polar substance. ....

- Water does not freeze inside living organisms bodies in the severely cold regions.

  ....

4 **Choose a property of water, and show**:

- What is meant by it?

  ....

- What is the cause of this property?

  ....

- What is its importance for living organisms?

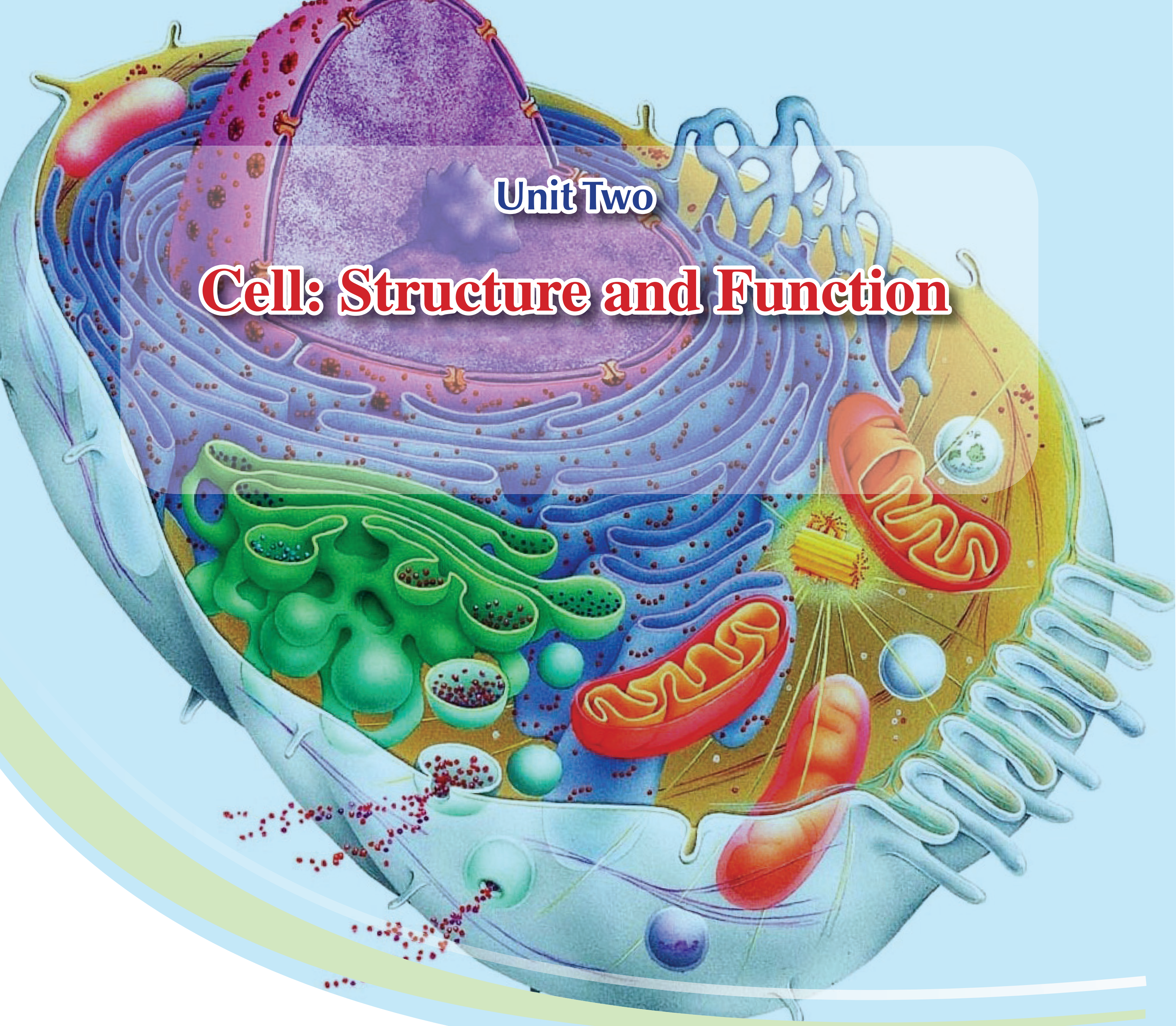
  ....

5 Show the importance of water surface tension for living organisms?

....

6 What that describes the three dimensional shape of protein?

....



Unit Two

Cell: Structure and Function

Practical activity

Ideal using of the compound microscope

Safety precautions

Activity goal

Using a compound microscope correctly for examining some fine detalis that can not be seen by naked eye.

Acquired skills

Using scientific devices , observing, comparing, recording and analyzing data.

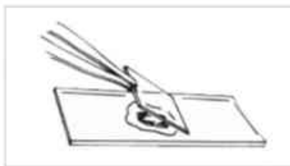
Materials needed

An onion , glass slide, coverslip, forceps, compound microscope, scalpel , dropper, blotter, iodine solution

You will use the compound microscope in several activities. You can use it correctly in this activity.

Procedure:

1. Cut the onion into 4 pieces.
2. Using forceps , separate a part of the thin transparent membrane lining the concave surface of one of the pieces. Put it on a water drop placed at the middle of a glass slide, then cover it with a coverslip.
3. Examine using the low power objective lens, then the high power one of the microscope. Observe the most superficial layer of cells.
4. Use a blotter to remove excess water then add a drop of iodine at an edge of the coverslip. Iodine will diffuse throughout the specimen
5. Re-examine the specimen using the low, then high power objective lens of microscope. Observe the difference.



Observation and data recording and analyzing

1. **Observe :** How many cells that you could see using low power objective lens of microscope? ....

2. **Observe** : How many cells that you can see using the high power objective lens?

....

3. **Observe** : How did onion cells appear using iodine solution instead of water?

....

Conclusion:

1. Why is the microscope used? .

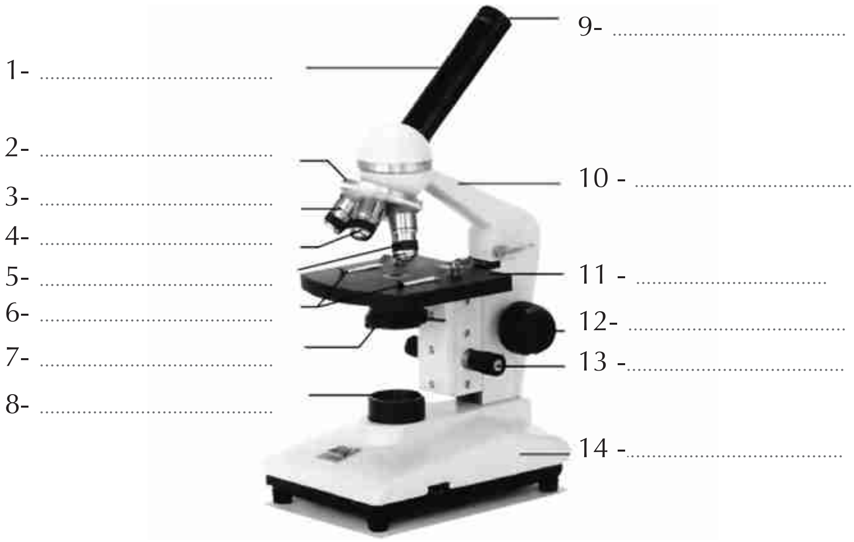
....

2. How can microscope be used correctly?

....

Assessment activity

1 the following figure shows a compound microscope:



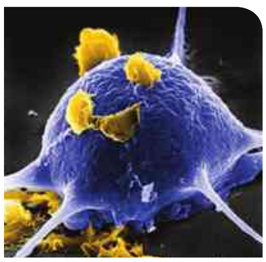
- Name the numbered parts?
- Calculate the magnifying power of the microscope in case of using an objective lens(40x), knowing that the magnifying power of the eye piece lens is (10x).

  ....

- What is the part responsible for controlling the concentration of light directed to the slide? ....
- What is the function of part no. 13 ? ....

2 The following figures (A and B) illustrate two nerve cells. Identify which of them is photographed by the scanning electron microscope and which by the transmission electron microscope . Why ?


(A)


(B)

....

....

Practical activity

comparing plant and animal cells

Safety precautions

Activity goal

Comparing the plant and animal cells.

Acquired skills

Working in a team, observing , scientific drawing , recording and analyzing data, Concluding ,designing experiments.

Materials needed

Glass slides, Elodea plant leaves, forceps , dropper, water , prepared slide of human check cells, compound light microscope .

Cooperate with your colleagues in the group to perform this activity and discuss them about the observation the have reached. Explain and compare the results with that of 2 other groups. Participate in expressing an opinion during the group discussion that occur under the supervision and guidance of your teacher .

Procedure:

1 Use forceps to separate a young leaf from the tip of *Elodea* plant and put it on a drop of water places on a glass slide. Cover with a coverslip.

2 Examine the leaf by the low power objective lens (4x) of the microscope, then by the medium power one (10x). Observe the superficial layer of leaf cells .

3 Draw some cells you saw. Label its different structures .

4 Examine the specimen using the high power objective lens (40x). What are the cellular structures you observed now? Draw these structures inside the cells that have already drawn and label them .

....

5 Repeat the steps (2-4) with the prepared slide of human check cells.

Observing and diagrammatic drawing:

Plant cell	Animal cell

Recording and analyzing data:

1 Record the common and different structures you observed in both the cell of *Elodea* plant and the cell of human's check in the following table:

Elodea plant cell	Human's check cell	Common structures of both cells
....	....	....
....	....	....
....	....	....
....	....	....
....	....	....

2 What is the cause of plant leaf colouration by green colour?

....

....

3 How can you make the structures observed in the plant leaf cells more visible?

....

....

4 What are the organelles you expected to see , but did not appear at examination? Explain the reason.

....

....

Conclusion:

What do you conclude from this activity?

....

....

Applied activity

Designing a model of cell membrane

Safety precautions

Activity goal

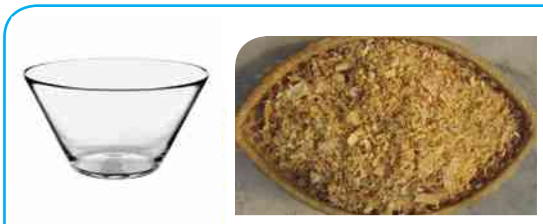
Designing a model illustrates cell membrane

Activity skills

Observing , analogy, concluding.

Materials needed

Glass dish, vegetable oil, water , and fine sawdust.



Procedure:

1 Bring a water filled glass dish .

2 Add a suitable amount of vegetable oil till cover water surface .

3 Disperse a little of the fine sawdust on the oil layer surface.

Observation and data recording and analyzing:

1 **Observe** : What will happen to oil after pouring it on water surface? ....

....

2 **Observe** : What will happen to sawdust after its dispersing on oil surface?. ....

....

3 **Analogy** : Whow what each of water , oil , and sawdust represents in structure of cell membrane?

....

....

Conclusion:

What do you conclude from this activity?

....

....

Applied activity

Designing a model for the chromosome

Safety precautions

Activity goal

Designing a model for the chromosome using environmental materials

Acquired skills

Designing , Innoving , working in a team

Materials needed

Isolated electric wire , disk-shaped magnetic pieces, pincers, and metallic stalk

Procedure:

1 Use the pincers to cut the electric wire into equal pieces (about 30 cm each) .

2 Roll the wire around the metallic stalk to get a spiral - shaped wire.

3 Fix the metallic wire upon the disc-shaped magnetic pieces.

- What does each spiral piece of wire represent? ....
- What does the magnetic piece represent? ....

4 What is the difference between the 2 figures (A) and (B):

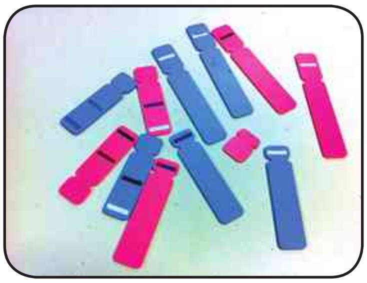
- (A) ....
- (B) ....
- Are the chromosomes equal in size? ....

(A)

(B)

5 Design another activity shows the chromosomes using wood or cardboard as in the opposite figure

- Are the chromosomes equal in size? ....



- What does it mean having a heterozygous pair of chromosomes in the opposite figure?....................
- What do you conclude from this activity? ....

Applied activity

Designing a model for plant cell or animal cell

Safety precautions

Activity goal

Designing a model illustrates ultrastructure of an eukaryotic cell

Acquired skills

Working in a team , designing models, analogy.

Materials needed

Various environmental materials.

Cooperate with your colleague to design a model for a plant or animal cell according to the following criteria:

- The model must be three - dimensional.
- The model dimensions are about 10×25×50 cm.
- The model must be light weight.
- Be creative by using the available materials in the environment such as the foam, cardboard, wood, clay, macaroni or noodles, adhesive materials, buttons, beads, threads, and so on.
- The model must include all the following:

• Cell membrane , nucleus, ribosomes, centrosome, endoplasmic reticulum, Golgi apparatus, mitochondria, lysosomes, and vacuoles (plant and animal cells).

• Cell wall and plastids (plant cell only).

- Each organelle must be labelled by its name or a number , with using a key attached to the model and shows the semantics (indications) of these numbers.
- By the end of making the model, present it to your colleagues with reference to each organelle and explaining its functions.

Watch out well

Do not use any materials that are vulnerable to decaying such as fruits, jelly, or vegetables .

Do not use pins or any other sharps objects.

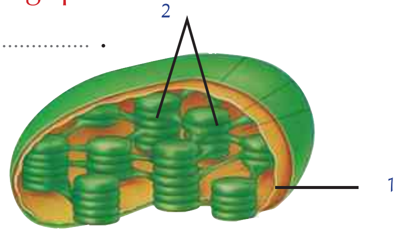
You can be guided by the following models:





Assessment activity

1 Study the following figure, then answer the following questions:



- The figure illustrates the structure of ....
- Write down the name of numbered parts:

  1: ....

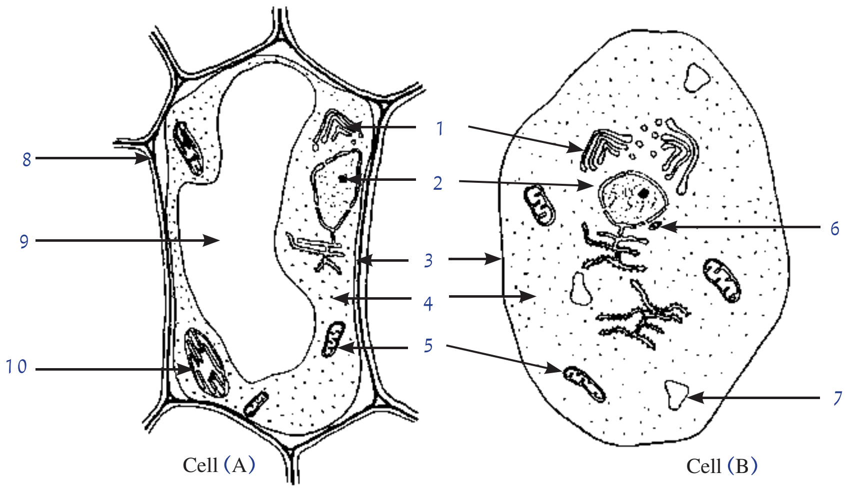
  2: ....

- What is the function of this organelle? ....

....

....

2 Examine the following figures, then answer the following questions:



- Specify the type of cells? A : .... , B: ....:
- Name the following numbered parts:

1: .... 2: .... 3: .... 4: ....

5: .... 6: .... 7: .... 8: ....

9: .... 10: ....

- What do you expect to happen when the organelle no. 2 is removed from the cell ? Explain.

....

....

3 In light of the study of the distinguishing characteristics of both prokaryotic and eukaryotic cells: in front of you a picture of a microorganism that live in the human alimentary canal . Specify the type of the cell of this organism , prokaryotic or eukaryotic ? Explain.

....

....

....

4 The following table shows some information about three different cells. Determine whether each cell is prokaryotic or eukaryotic. If any of them is eukaryotic, determine whether it is plant or animal cell. Give an explanation for the decision taken in each case, with each cell.

The structure	cell (A)	cell (B)	cell (C)
Cell wall	present	present	not present
Cell membrane	present	present	present
Chloroplastids	present	not present	not present
Mitochondria	present	not present	present
Nucleus	present	not present	present

- Cell (A) type: ....
- Cell (B) type: ....
- Cell (C) type: ....
- The explanation: ....

....

Practical activity

Examination of different types of plant and animal tissues

Safety precautions

Activity goal

Identification of different types of plant and animal tissues.

Acquired skills

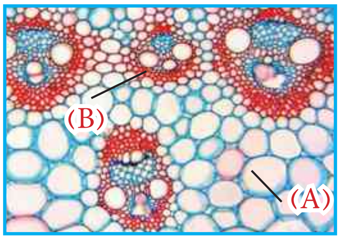
Observing , scientific drawing , recording and analyzing data.

Materials needed

Prepared slides of various plant and animal tissues , and compound microscope.

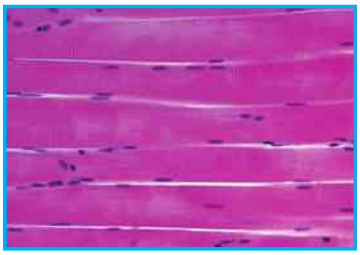
Procedure:

1. Microscopically examine a group of slides that your teacher will give you.
2. Compare these slides with the following figures, then answer the following questions.



Slide no. (1)

Slide no (2)



Slide no. (3)

Slide no. (4)

Slide no. (5)

3. Specify the types of tissues in the slide no(1)

A- ....

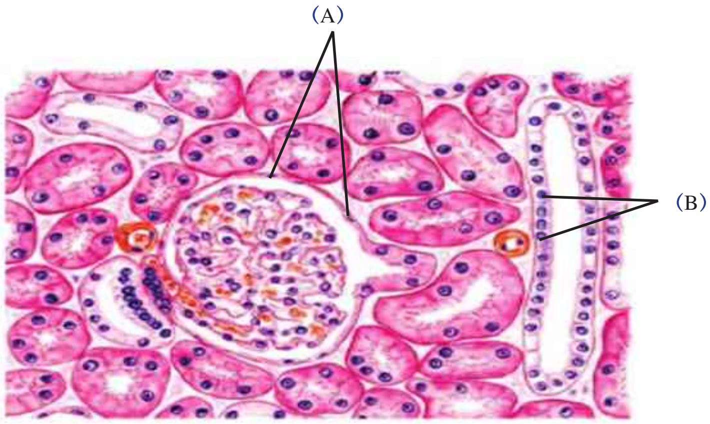
B- ....

4. Mention the types of tissues shown in slides (2), (3) , (4) and (5)

- Slide no. (2): ....
- Slide no. (3): ....
- Slide no. (4): ....
- Slide no. (5): ....

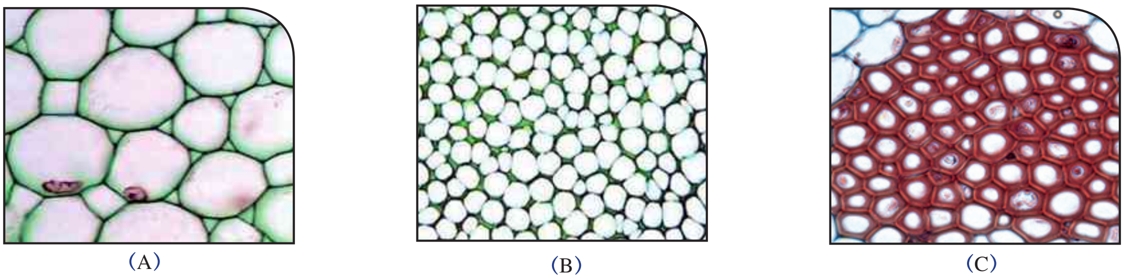
Assessment activity

1 The following figure illustrates the histological structure of a section in kidney. In light of study of distinguishing characteristics of animal tissues, specify the types of tissues that referred to in this section.



- The type of tissue (A): ....
- The type of tissue (B): ....

2 The following figures show 3 types of plant tissues . Examine these tissues, then answer the following questions:



- Mention the name of each tissue of them.

....

- Which of these tissues is responsible for attaching the different body tissues and organs together?

....

- Which of these tissue is non-living ? What is the function of this tissue?

....

....

Cell processes

Practical activity — Osmosis

Safety precautions

Activity goal

Studying the effect of osmotic pressure on the cells of potato tuber tissue.

Acquired skills

Working in a team , Observing, recording and analyzing data, Concluding , Designing of experiments.

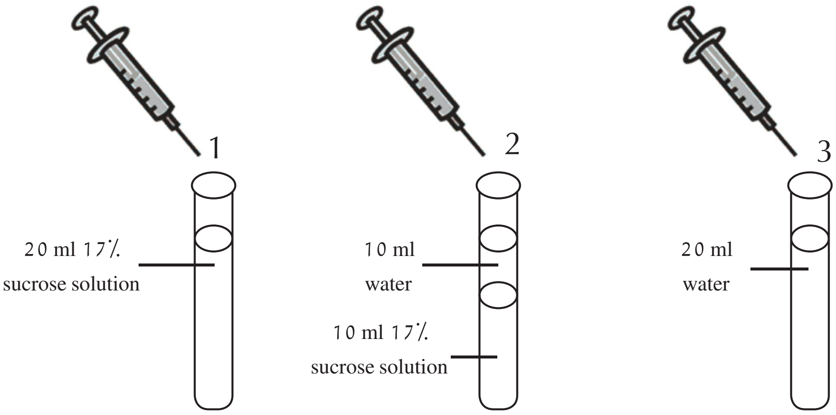
Acquired skills

Potato tuber, scalpel , tap water, sucrose, cork borer, syringe (25ml), 3 test tubes , tubes rack , marking pen , and pencil

Cooperate with you colleagues in the group to carry out this activity, discuss them about the observations they have reached . Explain and compare the results with that of another group. Participate in expressing an opinion during the group discussion that take place under the supervision and guidance of your teacher .

Procedure:

1. Label tubes by numbers 1, 2 and 3 .
2. Using a syringe, put 20 ml 17% sucrose solution (prepared by dissolving 17 g sucrose in 50 ml water , the completing by water to 100 ml) in tube no .(1).
3. In tube (2) , put 10 ml 17% sucrose solution and 10ml water , then shake well . The concentration becomes 8.5 % ٪
4. Put 20 ml water in tube (3).



5. Cut potato tuber at both ends. Use the cork borer to make 3 cylinders of potato tissue (fig. 1).
6. Use the pencil to exit the potato tissue out the cork borer . (fig. 2).

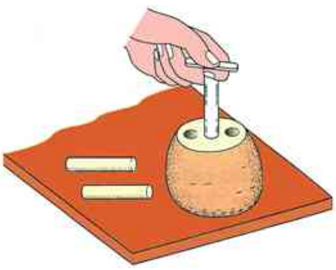


Figure (1)

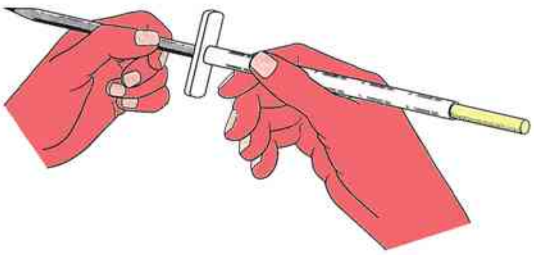


Figure (2)

7 Weigh the potato cylinders you obtained , then put one of them in each tube.

8 Leave the tube for 24 hours, then determine the weight of each cylinder of potato tissue.

9 Record data in the following table:

Observation :

	At beginning of experiment	After 24 hours of submerging in 17% sucrose	After 24 hours of submerging in 8.5% sucrose	After 24 hours of submerging in water
Weight of cylinder of potato tissue (g)	....	....	....	....

Data interpretation :

10 In light of osmosis concept, interpret what was happened to the cells of potato tissue in the following 3 cases:

- In 17 % sucrose: ....
- In 8.5% sucrose: ....
- In water: ....

Conclusion:

What do you conclude from this activity? ....

....

Designing experiments:

Design a similar experiment to determine the effect of osmotic concentration inside the cells of potato tissue.

Assessment activity

1 A unicellular organism is transferred from a fresh water container into a salty water container. What do you expect to happen for this living organism ? Explain.

....

....

....

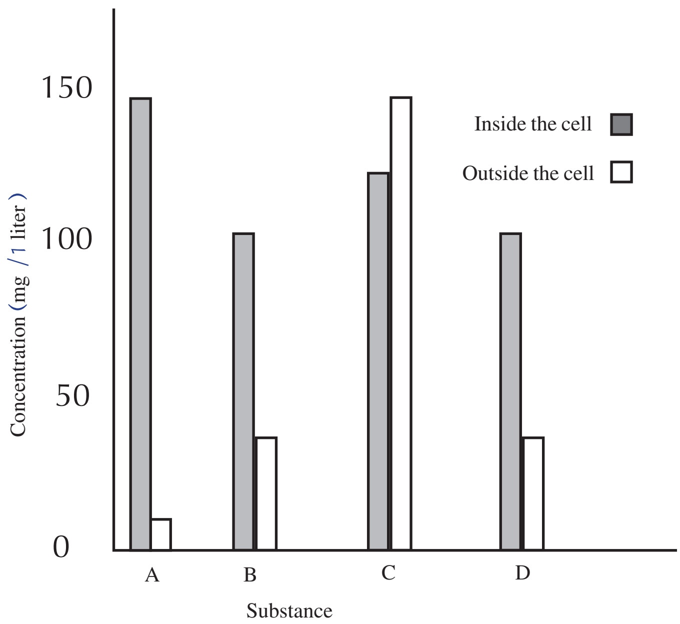
2 The following graph illustrates the relative concentrations of four substances (A, B, C, and D) inside and outside an animal cell

a Through the study of ways of materials transport from and into the cell, identify the way of transport of these substances.

b Which of these four substances the cell needs in the largest quantities?

c Which of these substances the cell needs evenly ? Explain.

d How can you explain the highest concentration of substance (C) outside the cell than its inside



Second unit exercises

First question: Give the scientific term for each of the following:

1. A microscope, its magnification power reaches to 1500 times at maximum. ( )
2. Cells that contain no nucleus, and devoid of the majority of membranous organelles. ( )
3. Cells that contain a definite nucleus. ( )
4. Eukarayotic cells characterized by containing a centrosome with 2 centrioles. ( )
5. A tissue consists of one type of cells. ( )
6. A tissue covers body surface externally and lines body cavities internally. ( )
7. Tissues that their cells are specialized in receiving the different external stimuli. ( )
8. Muscles composed of striated muscle fibres, and do not under the will in their work.( )
9. Parts of muscular tissue of the heart that make it pulses as a functional unit. ( )
10. Cellular structures responsible for protein synthesis. ( )
11. Cellular structures responsible for energy production in the cell. ( )
12. Movement of molecules across cell membrane from a region of high concentration to a region of low concentration until their concentration becomes equal on both sides of membrane. ( )
13. A process in which light energy is converted into chemical energy stored in food. ( )
14. A process in which the stored energy in food is released. ( )
15. Minute interlaced filaments that are tightly coild around themselves and change into chromosomes during cell division. ( )

Second question: Choose the correct answer:

1. Chloroplastids in the plant cell is concerned with:

A. performing photosynthesis B. storing energy C. storing excess food D. secreting protein

2. plasma membrane consists of :

A. one layer of phospholipids B. two layers of phospholipids
C. two layer of cellulose D. two layers of chitin

3. The small particles that found on the outer surface of rough endoplasmic reticulum are the ....

A. centrosome B. ribosomes C. cytoplasm D. plastids

4. All the following organisms are found in the animal all except:

A. centrosome B. mitochondria C. golgi apparatus D. chloroplastids

5. The tissue responsible for transporting water and salts from the root to leaves is the :

A. xylem B. phloem C. parenchya D. collenchyma

Third question: Compare between each pair of the following:

1

Prokarytic cells	Eukaryotic cells
....	....
....	....
....	....

2

Light microscope	Electron microscope
....	....
....	....
....	....

3

Cell membrane	Cell wall
....	....
....	....
....	....

Fourth question : Give reasons for each of the following:

1. Naming skeletal muscles by this name.

....

....

2. Epithelial tissues cover body surface externally.

....

....

3 Lysosomes can decompose the senile and worn organells.

....

....

4 Golgi bodies are abundant in glandular cells.

....

....

5 Plant cells have a difinit shape.

....

....

6 Plasma membrane has an important role in the cell.

....

....

7 Plant cells can perform photosynthesis, whereas animal cells can not do this process?

....

....

Fifth question: Mention the role played by each of the following scientists in discovering the cell:

1 Robert Hooke.

....

....

2 Schleiden.

....

....

3 Schwann.

....

....

4 Virchow.

....

....

Sixth question: **Mention the function of each organelle of the following:**

1. centrosome.

....

2. Golgi bodies.

....

3. Lysosmes.

....

Miscellaneous questions:

1. What is meant by each of the following :

- Diffusion:

....

....

- Active transport:

....

....

- Bulk movement:

....

....

2. What is the importance of both photosynthesis and respiration for living organisms?

....

....

3. Mention the main principles of cell theory?

....

....

4. Write down the name of 2 cellular organelles and their function.

....

....

Unit Three

Inheritance of Traits

Applied activity

Model of a karyotype

Safety precautions

Activity goal

Arranging chromosomes to form a karyotype

Acquired skills

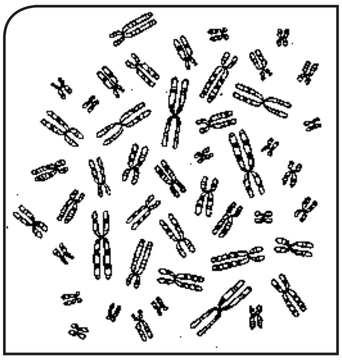
Designing , Innovation , Hand working, Classifying

Materials needed

Paper , scissors , waxy adhesive , and pencil

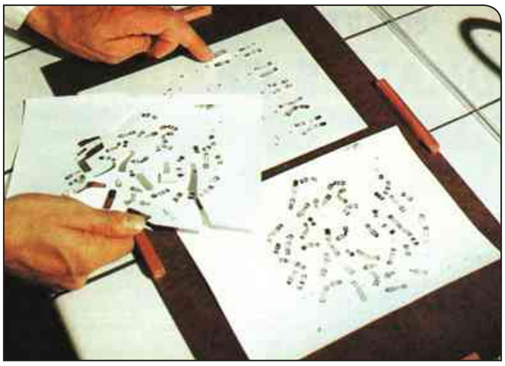
Procedure :

1. photograph and magnify a group of chromosomes using figure (1)

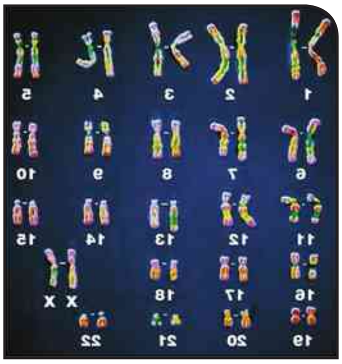


(a)

2. Use the scissors to get cuttings of different chromosomes.
3. Use the waxy adhesive to paste chromosomes on a white paper by arranging them descendingly in identical (homologous) pairs according to their size , as in figure (c)



(b)



(c)

4. Under each chromosomes pair , write the number that indicates its order .
5. How many pair of chromosomes you arranged? ....

Examine the karyotype in figure (c) , then answer the following questions:

6. Does this figure represent a karyotype for a somatic cell or a sex cell?
   Why? ....
7. How many chromosomes in figure (c) ? ....
8. What is the sex of the owner of this karyotype ? ....
   Why?..........

Applied activity | Chiasma and crossing over model

Safety precautions

Activity goal

Concluding importance of crossing over occurrence

Acquired skills

Designing, Innovation , Team working, Expressing by drawing

Materials needed

Paper board, scissors , colouring pencils, compass, ruler, eraser, adhesive material , and pencil

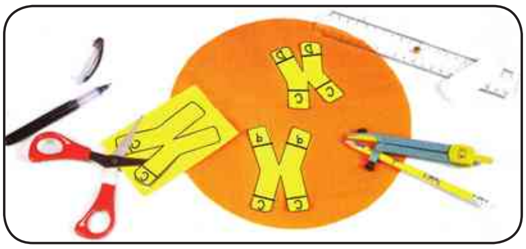
Procedure :

1. Using a pencil , draw a mode of a cell , and another one for a pair of chromosomes , as in the figure.
2. Use the scissors to cut the pair of chromosomes
3. Use the pencil to write symbols of genes on certain locations of the pair of chromosomes.
4. Use colouring pencils in colouring the locations of genes on the chromosome pair.

Record the order of genes on the pair of chromosomes.

....

Use the chromosome pair in making the stages of tetrad and chiasma.



5. Cut the crossed parts and use them in representing the case of crossing over.

Record the new arrangement of genes found on the chromosome pair.

....

6. Design 2 paperboard models for 2 cells, then place each chromosome in a separate cell
7. Use the scissors to cut each chromosome into 2 chromatids .
8. Design 4 models of cells using paperboard, then place each chromatid in a separate cell.

Observation:

- Are the four cells similar ? Why?

Expectation:

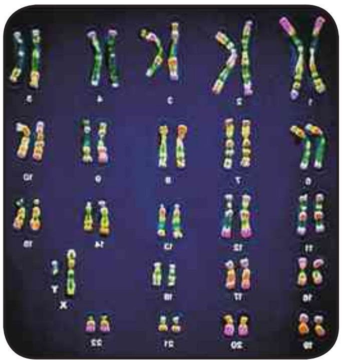
- What do you expect in case of non-occurrence of crossing over?
- Are the four cells similar? ....

Expression by drawing :

9. Draw the steps of occurrence of both chiasma and crossing over .

Assessment activity

1 Does the karyotype represent a somatic cell or a sex cell ? Why ?



....

2 Does it represent a cell of a male or a female ?

Why? ....

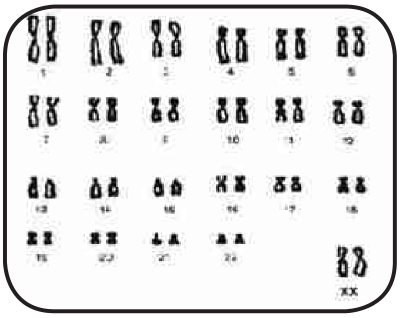
3 How many autosomes ? and how many sex-chromosomes?

....

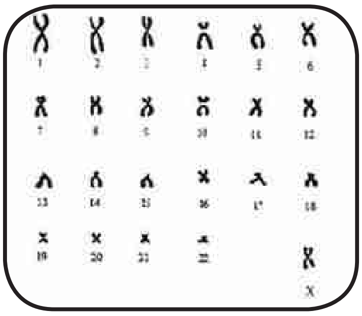
2 Which of the 2 karyotypes represents a somatic cell? Which of them represents a sex-cell? Why?

....

....



Karyotype (A)



Karyotype (B)

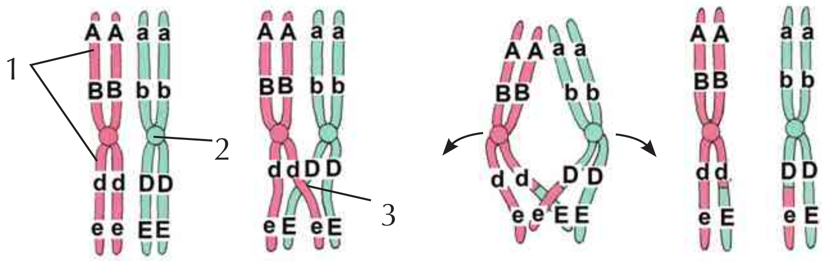
2 Does karyotype (A) represent a cell of a male or a female ? ....

Why ....

3 How many autosomes? And how many sex chromosomes are there in both karyotype (A) and karyotype (B) ? ....

3 The following figure illustrates an important phenomenon.

1 What is the name of this phenomenon ? When it occurs ?



2 Exchange the numbers by the correct lables :

(1) .... (2) .... (3) ....

3 What are the new arrangements resulting from the occurrence of crossing over?

....

4 Write the genotype of expected gametes resulting from the occurrence of crossing over . ...

5 What are your expectations for the genotype of gametes if the genes remained without the occurrence of crossing over? ....

Practical activity: Effect of light on chlorophyll appearance in green plants

Safety precautions

Activity goal

Concluding the effect of light on chlorophyll appearance in a green plant

Acquired skills

Observing, Comparing, Recording and Analyzing data , Concluding

Materials needed

Agricultural soil , plastic or pottery container, corn or wheat gains , and water

Procedure :

1. germinate a group of wheat or corn grains in a dark place and an identical group in illuminant place. Irrigate the seedlings regularly for several days.

Observation:

- Record your observations about the colour of seedlings in both groups .

First group : ....

Second group ....

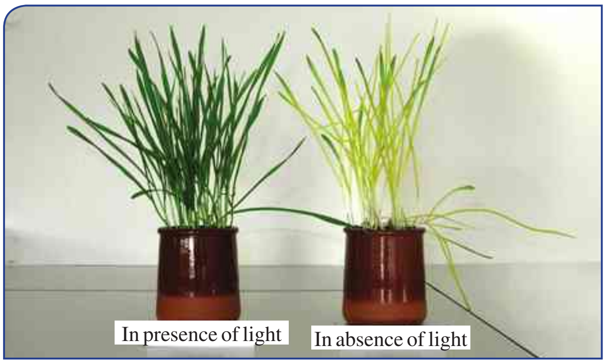
Is there a relationship between the presence of light and appearance of green colour in seedlings ?

....

Explanation:

- What is the explanation of this relationship?

....



Effect of light absence on colour of wheat seedlings

Conclusion

- What do you conclude from this activity?

....

- Give some examples ensure that appearance of traits is affected by the environmental factors.

....

Assessment activity

1 The following table shows the resulted generation from crossing of 2 strains of pea plants. Answer the following questions:

♀ \ ♂	AB	--	aB	ab
--	(2)	AABb	(1)	AaBb
--	(4)	AAbb	(3)	Aabb

1. What are the genotypes of plants no. 1, 2, 3, and 4? ....
2. Infer the phenotypes of parents. ....
3. What is the percentage of white - flowered plants resulted from this crossing?

   ....

4. What is the colour of pea flowers resulted from crossing of plant no. (3) and plant no. (4) ?

   ....

2 The following table shows the four blood groups:

1. Write the genotypes of the following blood groups:
   - Group (A) : ....
   - Group (B) : ....
2. Write down the types of antibodies in their proper places inside the table.
3. Write down the types of antigens in their proper places inside the table

The group	O	AB	B	A
Antibodies	....	....	**anti -a**	....
Antigens	....	....	....	**A**

3 Examine the opposite table that shows the results of blood groups detection , then answer the following questions:

1. Identify the expected blood group in each case indicated in the table. ....

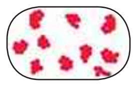
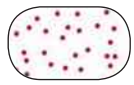
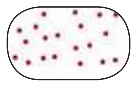
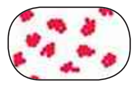
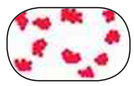
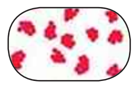
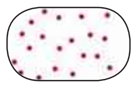
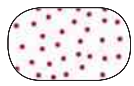
   ....

2. What is blood group that contains both types of antigens? ....
3. What is blood group that donates blood to all other blood groups?

   ....

4. If your blood group is (A) and you need to blood transfusion, what are the proper blood groups for you? why?

....

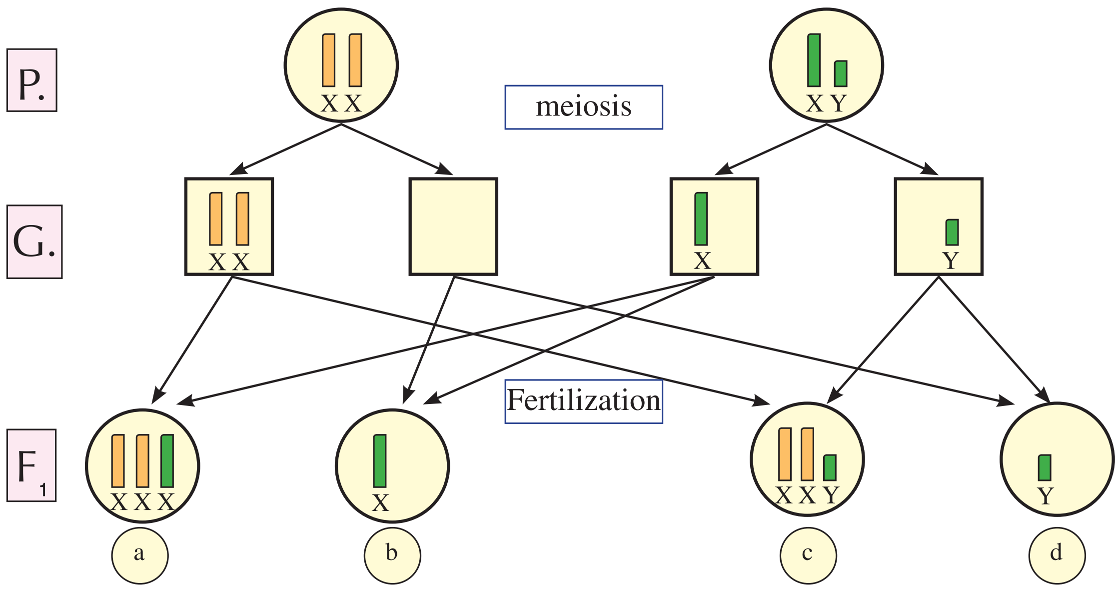
Blood group	**anti-a**	**anti-b**
....		
....		
....		
....		

Assessment activity

Abnormal chromosomal cases in humans

Sometimes, during gamete formation by meiosis the sex chromosomes are not equally distributed due to their adhering closely to each other.

- The following figure shows the genetic analysis of some abnormal chromosomal cases in humans



Abnormal chromosomal cases in humans

1 Is the error occurs during the formation of sperms or ovules?

....

....

2 how the abnormal case XXX is produced?

....

....

3 What is the chromosomal structure resulted from fertilization of an abnormal ovum (22 + XX) by a healthy sperm (22 + Y)?

....

....

Assessment activity

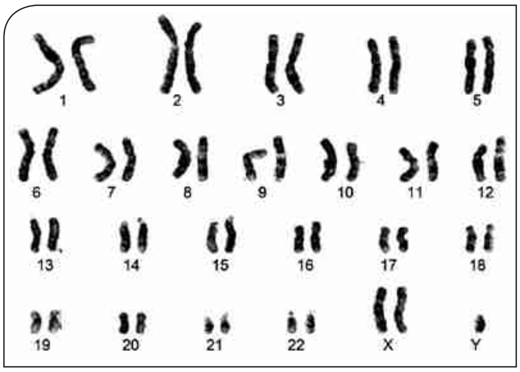
- In the following table, compare between the syndromes of Klinefelter , Turner and Down.

Points of comparison	Klinefelter's syndrome	Turner's syndrome	Down's syndrome
The type of chromosomes in which the error occurs	....	....	....
Chromosomal structure	....	....	....
No. of chromosomes	....	....	....
The sex	....	....	....
Symptoms	....	....	....

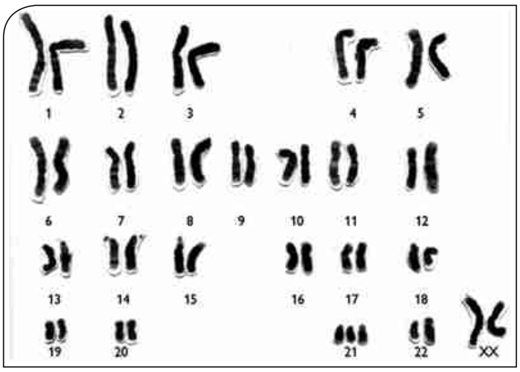
Assessment activity

Studying the karyotype:

1- Study the karyotypes (A) and (B), then record data in the following table:



karyotype (A)



Karyotype (B)

	Karyotype (A)	Karyotype (B)
Type of error	....	....
The name of case	....	....
The sex	....	....
Symptoms	....	....

Examine the 2 following karyotypes, then answer the following questions:

1 How many chromosomes in karyotype (A)?

....

and karyotpe (B)?

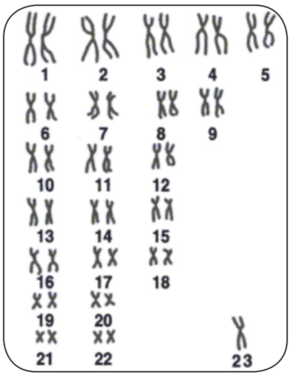
....

2 Identify the sex of individual from the karyotype (A)

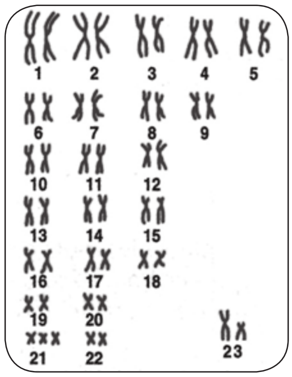
....

And karyotpe (B).

....



Karyotype (A)



Karyotype (B)

3 What is the name of the abnormal case that is referred by both karyotypes (A) and (B)?

....

4 Mention the symptoms in both karyotypes (A) and (B). ....

....

- What is the cause of their occurrence?

....

Applied activity

Designing a pedigree

Safety precautions

Activity goal

Designing a pedigree

Acquired skills

Designing, Predicting, Concluding, Genetic analysis

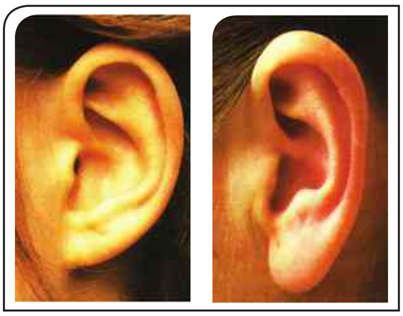
Materials needed

Paperboard, scissors, colouring pencils, compass, ruler, eraser, and pencil

Procedure:

1 Choose a trait that you observe among some members of your family such as that you observe in the following photos :

The ability tongue rolling



Fusion of ear lobe

2 Represent the mother by a circle ◯ and father by a square ☐ , then colour the shapes that carry the trait you want to study in your family.

3 Draw a horizontal line connecting the square and circle, then mention to anything this line refers to?

4 Draw vertical lines extend from the previous horizontal line, then mention to anything these lines refer to?

5 Draw a number of shapes (a square or a circle) to represent you and brothers and sisters then colour the shapes that represent individuals carrying the trait you study.

- Mention the possibilities of inheritance of the trait understudy among your brothers and sisters, then state the ratio of this trait appearance?

  ....

- Analyze the results you reached on genetic bases.

  ....

- What are your expectations of this trait appearance in the next generations?

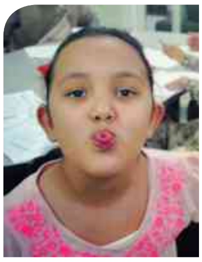
  ....

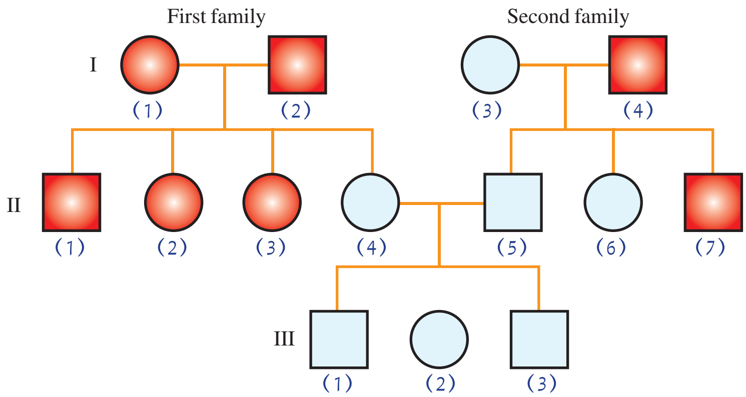
- Mention some other traits that found among the members of your family and you can represent them by a pedigree.

  ....

Assessment activity

1 The following pedigree shows the inheritance of the ability of tongue rolling trait. Study the pedigree, then show the following:





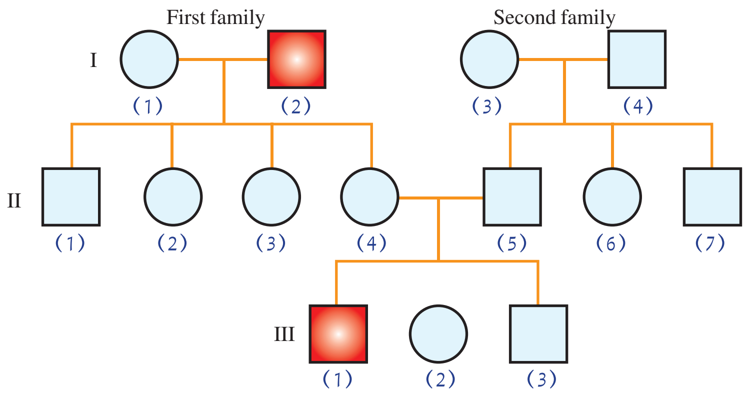
1 Is the trait dominant or recessive? Why?

2 What is the possible genotype of individuals represented by the following numbers?

(1) I .... (3) I .... (3) II ....

(5) II.. (1) III ....

2 The following pedigree illustrates the inheritance of haemophilia trait.



1 Is the trait dominant or recessive? ....

2 Write down the possible genotype of individuals represented by the following numbers :

(1) I .... (2) I.. (4) II ....

(5) II.. (1) III ....

3 Predict the possibility of appearance of haemophilia from mating of number (1) II with a healthy woman of this disease.

....

Unit three exercises

First question: Choose the correct answer:

1 Crossing over takes place during meiosis in:

a- prophase I b- prophase II

c - anaphase I d - anaphase II

2 The second generation ratio of crossing of 2 individuals differ in a pair of allelic characters in case of lack of dominance is:

A. 3 : 1 B. 1 : 2 : 1 C. 9 : 7 D. 2 : 1

3 The percentage of offspring with blood group (o) resulted from mating of a man with blood group (A B) and a woman with group (O) is:

A. 25% B. 50% C. 0 % D. 75%

4 The blood group that has the two types of antigens is:

A. A B. B C. AB D. O

5 If a parent has blood group AB, he can not give a child with blood group:

A. A B. B C. AB D. O

6 The flower colour character of pea plant represents a case of:

A. Lack of dominance B. Lethal genes C. Multiple genes D. complementary genes

7 The inheritance of yellow colour of mice represents a case of:

A. Complementary genes B. Lack of dominance C. Lethal genes D. d - sex - linked trait

8 The chromosomal structure of Turner's syndrome is

A. XY B. XX C. XXY D. XO

9 The inheritance of milk secretion in cattle is an example of .... traits.

A. Sex - linked B. Sex - influenced C. Sex - limited D. d - Mendelian

10 The case of male Down's syndrome comes from fertilization of a healthy ovum by a sperm:

A. 22 +XY B. 22 + Y C. 23 + Y D. 23 + X

11 When a healthy man marries a colour blinded woman, this disease will appear in .... of their offspring.

A. All males B. All females C. Half of males D. Half of females

Second question: Write the right scientific term:

1. A group of different genes located on a chromosome and inherited together ( )
2. The point of attachment of internal chromatids in the homozygous chromosomes. ( )
3. The genes when found in the homozygous state lead to the retardation of growth and cause death to almost one fourth of the offspring at different stages. ( )
4. Exchanging of parts of chromatids in a pair of homologous chromosomes. ( )
5. A type of antigens found on surface of red blood cell, and cause abortion of the pregnant woman. ( )
6. Genetic data displayed in the form of a diagram that shows how a certain trait is inherited and benefits to follow up different traits. ( )
7. The genes influenced by sex hormones and carried on autosomes. ( )
8. An abnormal case resulted from fertilization of an abnormal ovum (22 + XX) by a sperm (22 + Y). ( )
9. An abnormal case resulted from fertilization of an abnormal ovum (22 + O) by a sperm (22 + xy). ( )
10. An abnormal case originates due to presence of excess chromosome in the chromosome pair number 21. ( )

Third question: What would happen in the following cases:

1. A woman (Rh^-) married a man (Rh^-) for their first and second babies.

....

2. Mating of yellow mice together.

....

3. Transfusion blood from a person with blood group (AB) to another person with group (A)

....

4. Germinating seedlings of a corn plant in a dark place.

....

....

5. Fertilization of an ovum (23 + x) with a sperm (22 + x)

....

....

Fourth question: Give reasons:

1. When 2 individuals differ in a pair of allelic traits, the ratio of second generation is 1 : 2 : 1, not 3:1.

....

....

2. Klinefelter's syndrome affects males only, while Turner's syndrome affects females only.

....

....

3. Down's syndrome affects males and females.

....

....

4. Colour blindness disease is more widespread among males than females.

....

....

5. Blood group (AB) is a universal receiver while blood group (O) is a universal donor.

....

....

Fifth question: Compare between each pair of the following:

1.

Blood group (A)	Blood group (B)
....	....
....	....
....	....
....	....
....	....

2.

Lethal genes	Complementary genes
....	....
....	....
....	....
....	....
....	....

Sixth question: Explain the following cases on genetic bases:

1 A man with blood group (A) married a woman with blood group (B), they gave birth a child with blood group (O)

2 A mother with blood group (AB) has a son with the same group. What are the possible genotypes of the father without a genetic analysis?

3 What is the flowers colour of pea flower plants resulting from the following crossing: AAbb × aaBb ?

4 Crossing of an *Antirrhinum* plant carries red flowers with another one carries pink flowers.

Unit Four

Classification of living organisms

Applied activity

Designing a taxonomic key

Safety precautions

Activity goal

Classifying a group of leaves and designing a dichotomous key that can be used to identify the leaves.

Acquired skills

Observing, organizing, Classifying, Designing, Recording and analyzing data, Concluding.

Materials needed

6 - 10 different types of leaves, a ruler, magnifying hand lens.

Procedure:

1 Gather a group of leaves that are different in shape and size from your environment.

2 Identify the characteristics you will use for classifying the leaves.

Size: ....

Colour: ....

Shape: ....

3 Design a dichotomous Key you will use to classify the leaves.

....

....

....

....

....

....

4 Revise your key as needed, to make it easier to use.

Are there other ways in which you could have grouped the specimens ? Describe these alternate ways.

....

- Compare the key you have designed with that designed by your colleagues in the group.

....

....

Practical activity

Shapes and characteristics of bacteria

Safety precautions

Activity goal

Examining different types of bacteria and classifying them according to their shape.

Acquired skills

Working in a team, Examining, Observing, Scientific, drawing, recording and analyzing data, Classifying, Interpreting C,oncluding.

Materials needed

Slides of the 3 types of bacteria [spherical (cocci), rod-shaped (bacilli) and spiral - shaped (spirilla)], light microscope with an oil immesion lens

Cooperate with your colleagues in the group for examining slides, demonstrating observations, exchanging the views and comparing the results with that of other groups. Then participate in expressing an opinion through the group discussion which carried out under the supervision and guidance of your teacher.

Procedure:

1. Examine using the microscope each of the three numbered slides (1 - 3) that your teacher has given you.
2. Make a rough sketch of each bacterium, and classify it as either cocci, bacilli, or spirilla .

Observation and scientific drawing:

1. What did you have observed in each of the 3 slides?
   - Slide (1): ....
   - Slide (2): ....
   - Slide (3): ....
2. Draw a diagram for what you observed in each type of bacteria.

Slide 1	Slide 2	Slide 3

Classifying:

1. What is the criterium used in classifying these three types of bacteria?

   ....

2. What are the differences between the shapes of these 3 types of bacteria?
   - The type of bacteria in slide (1): ....

- The type of bacteria in slide (2): ....
- The type of bacteria in slide (3): ....

3 What are the similarities in the specimens you examined? ....
....

Practical activity — Examining protists in pond water

cooperate with your colleagues in the group for carrying out the procedure of this activity and discussing, comparing and interpreting the results.

Safety precautions

Activity goal

Examining a sample of pond water, indentifying protists exist, and specifying the mean of locomotion in each of them

Acquired skills

Working in a team, observing, recording and analyzing data, interpreting Concluding.

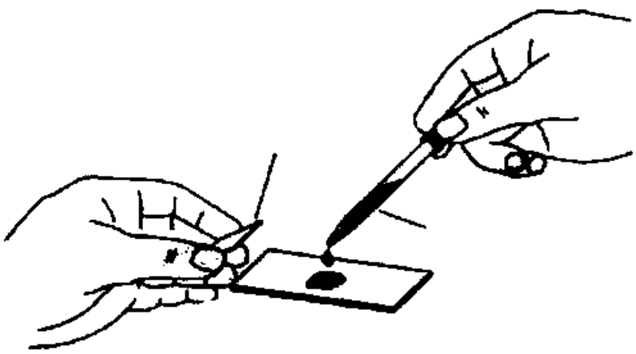
Materials needed

Pond water, glass slides, coverslips, compound light microscope, glass rod, and dropper.

After that a group discussion will be conducted under supervision and guidance of your teacher to interpret the results to come into a conclusion.

Procedure:

1. Bring a small, fresh sample of pond water.
2. Place a drop of pond water on the slide, and cover it with a coverslip.
3. Use the microscope to examine pond water under low power objective lens.



A figure illustrates how is a drop of pond water placed on the slide, then covering it using a coverslip to examine it microscopically

Scientific drawing and data recording

1. Observe and try to identify some free living protists you studied. Sketch each of them.

Sketch the organisms you see and record how each of them moves.

....

Describe the different organisms which you observe in pond water ....

....

Conclusion:

- What do you conclude from this activity? ....

....

Practical activity

Examining Ferns

Safety precautions

Activity goal

Examining a leaf of fern plant and identifying its characteristics.

Acquired skills

Observing, Scientific drawing, Recording and analyzing data, Concluding.

Materials needed

Fern plant, hand lens, water and plastic dropper.

Procedure:

1. Your teacher will give you green leaves of a fern plant to examine.
2. Use the hand lens to examine the upper and lower surfaces of the fern leaf. Record your observations.
3. Sketch the fern leaf and illustrate the structures appear on its lower surface.

Conclusion:

- What are the structural characteristics of the fern leaf? ....

....

practical activity

Examining a flowering plant

Safety precautions

Activity goal

Examining different parts that the flowering plants consists of and identifying whether it is different in the appearance, texture and flowers from other flowering plant or no.

Acquired skills

Working in a team, Observing, Scientific drawing, Recording and analyzing data, Concluding.

Materials needed

Flowered bean plant, flowered lily plant, and hand lens.

Cooperate with your colleagues in the group for carrying out this activity, demonstrating observations, exchanging the views and comparing the results with that of other groups. Then participate in expressing an opinion through the group discussions carried out under the supervision and guidance of your teacher.

Expectation: Knowing the main parts of the flowering plant

procedure:

1. Observe the plant of your group and draw it. Label the names of plant parts as you can.
2. Use the hand lens to observe the plant parts in more detail. Record your observations about the appearance of those parts and their structure.

Lily plant

Bean plant

Observation and scientific drawing:

1. Observe different parts of the flowering plant. What are these parts? ....

....

2. Sketch the plant, and label the names of its parts.

Analyzing data

1. Compare the results of your group with that of other groups in the following table.

Comparison points	1st group (Bean plant)	2nd group (Lily plant)
Roots:	....	....
Leaves:	....	....
No. of floral whorls:	....	....

2. Are all flowering plats share the same parts?

....

....

Conclusion:

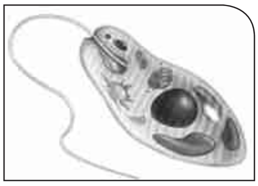
- What do you conclude from this activity?

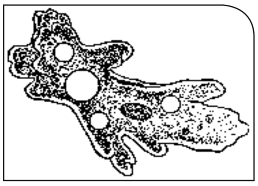
....

....

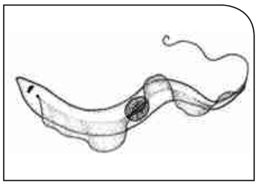
Assessment activity

The following figures illustrate some protists:


(A)


(B)


(C)


(D)

1 Specify the phylum and class that each organism belongs to.

- (A) ....
- (C) ....
- (B) ....
- (D) ....

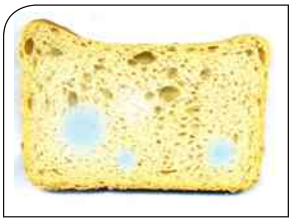
2 Identify the mean of locomotion for each organism.

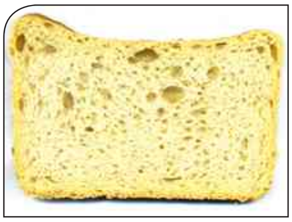
....

3 Based on what do you know about the ways of locomotion in animal- like protists (protozoa), which class of them is commonly exist in soil?

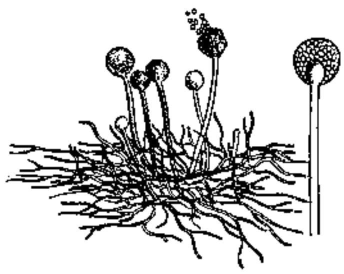
....

When two pieces of bread, one of them is dry and the other id wet, were leaved in a warm place for 3 - 4 days, the results were as the following :


The dry bread piece


The wet bread piece

When examining the developing mould on the wet bread piece using microscope, the following organisms were observed:



1 What is the cause of change occurred to the wet piece of bread?

....

2 What is the source of change occurred to the wet piece of bread?

....

3 Why did not a change occur to the dry piece of bread as the wet piece? ....

4 Specify the phylum that these developing organisms on the wet piece of bread are belonging to.

....

Practical activity: Examining earth worms

Safety precautions

Acquired skills

Observing, Describing, Analyzing, Concluding.

Activity goal

Identifying the characteristic features of earth worms.

Materials needed

Earth worms in a container of damp soil, old newspapers (or white papers), forcepses, magnifying lens, and plastic rulers.

Procedure:

1. place the worms over newspapers.
2. Determine the length of a worm using the ruler.
3. Let the worms move.
4. Watch the body of worm when they move.
5. Try hearing the sound of worms movement.
6. Catch a worm and pass your fingers on the ventral surface from back to front.
7. Count the segments in earth worm body.

Observation and data analyzing:

1. Describe the external shape of earth worm. ....
....
2. Describe the movement of earth worm and explain how its external structures allow movement. ....
....
3. What is your felling when you passed your fingers on the ventral surface of the worm? ....
....
4. Do you hear a sound when the worm moves on the paper? ....
....

Conclusion

1. Conclude: What are the characteristic features of annelids (ring worms) such as earth worms? ....
....
....

Practical actively

Comparing reptiles with amphibians

Safety precautions:

Activity goal

Comparing the prominent morphological characteristics of a reptilian animal and amphibian one

Acquired Skills

Observing, Recording and analyzing data, Concluding.

Materials needed

Preserved specimens of lizards and toads

Cooperate with your group colleagues in carrying out this activity, demonstrating observations, exchanging the views and comparing the results with that of 2 other groups. Then, participate in expressing an opinion through the group discussion which carried out under the supervision and guidance of your teacher.

Identify which of the structural characteristics can be used for distinguishing and comparing between reptiles and amphibians ....

....

Procedure:

1 Observe both the lizard and toad without touching. Describe what to do you see.

Observation and data recording:

1 Observe both the lizard and toad. Describe the most important morphological structures for both.

- Toad's characteristics: ....
- Lizard's characteristics: ....

Analyzing data:

1 What is the more obvious difference between the morphological structures of both the toad and lizard? Mention the other differences you observed. ....

....

2 How does the skin of both animals seem? ....

....

Conclusion:

What are the external structures that can be used for distinguishing between reptiles and amphibians? ....

Applied activity

Animals classification

Safety precautions

Activity goal

Classifying different kinds of animals according to the distinguishing characteristics of each.

Acquired skills

Working in a team, Observing, classifying.

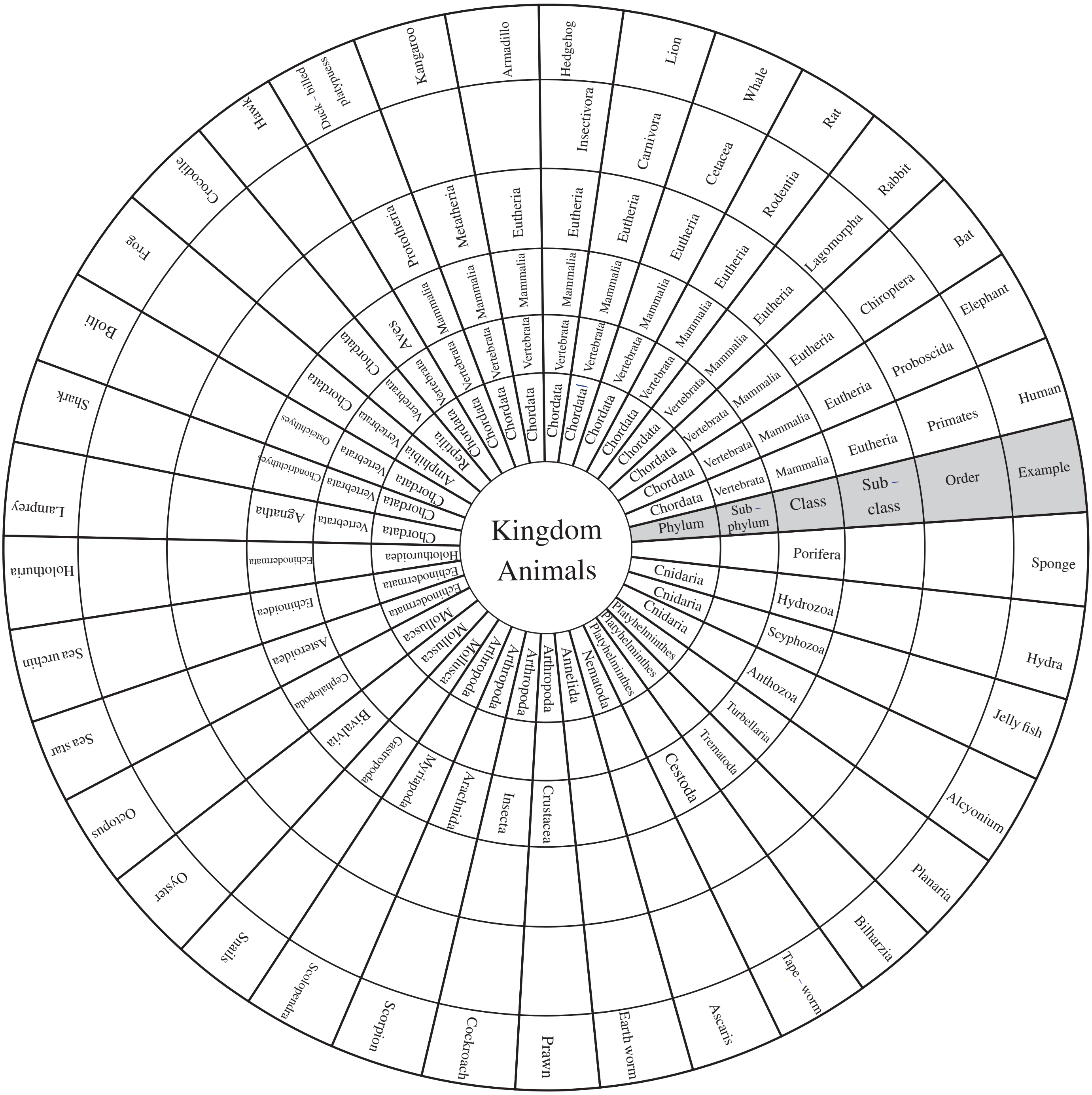
Materials needed

Compass, cardboard, and scissors.

Share a group of your colleagues in carrying out this activity. Debate and exchange views in every attempt before making sure the correct answer shown in the model.

Procedure:

1. Use the compass and scissors to design a disc of cardboard of a radius 8 cm.
2. Place this disc over the circle shown in this activity, so the 2 centers of both circles are coincide together.
3. Cut a section of the disc, so the shaded part of the circle appears.
4. Start the activity by choosing one of animal examples, then determine the order, class and phylum that this example belongs to
5. Discuss your group about the answer you reached, then make sure the correctness of the answer by moving the disc, so the cut section of disc faces this example.


Kingdom
Animals
Phylum
Sub - phylum
Class
Sub - class
Order
Example
Porifera
Sponge
Cnidaria
Hydrozoa
Hydra
Cnidaria
Scyphozoa
Jelly fish
Cnidaria
Anthozoa
Alcyonium
Platyhelminthes
Turbellaria
Planaria
Platyhelminthes
Trematoda
Bilharzia
Platyhelminthes
Cestoda
Tape - worm
Nematoda
Ascaris
Annelida
Earth worm
Arthropoda
Crustacea
Prawn
Arthropoda
Insecta
Cockroach
Arthropoda
Arachnida
Scorpion
Arthropoda
Myriapoda
Scolopendra
Mollusca
Gastropoda
Snails
Mollusca
Bivalvia
Oyster
Mollusca
Cephalopoda
Octopus
Echinodermata
Asteroidea
Sea star
Echinodermata
Echinoidea
Sea urchin
Holothurioidea
Echinodermata
Holothuria
Chordata
Vertebrata
Agnatha
Lamprey
Chordata
Vertebrata
Chondrichthyes
Shark
Chordata
Vertebrata
Osteichthyes
Bolti
Chordata
Vertebrata
Amphibia
Frog
Chordata
Vertebrata
Reptilia
Crocodile
Chordata
Vertebrata
Aves
Hawk
Chordata
Vertebrata
Mammalia
Prototheria
Duck - billed platypuss
Chordata
Vertebrata
Mammalia
Metatheria
Kangaroo
Chordata
Vertebrata
Mammalia
Eutheria
Armadillo
Chordata
Vertebrata
Mammalia
Eutheria
Insectivora
Hedgehog
Chordata
Vertebrata
Mammalia
Eutheria
Carnivora
Lion
Chordata
Vertebrata
Mammalia
Eutheria
Cetacea
Whale
Chordata
Vertebrata
Mammalia
Eutheria
Rodentia
Rat
Chordata
Vertebrata
Mammalia
Eutheria
Lagomorpha
Rabbit
Chordata
Vertebrata
Mammalia
Eutheria
Chiroptera
Bat
Chordata
Vertebrata
Mammalia
Eutheria
Proboscida
Elephant
Chordata
Vertebrata
Mammalia
Eutheria
Primates
Human

Applied activity

Designing a concept map

Design a concept map using the following terms:

Birds	Mammals	Skin covered with hair	Reptiles
Pulmonary breathing	Amphibians	Scales	Viviparous animals
Feathers	Horny scales	Weak limbs	Vertebrates
Cutaneous (skin) breathing	Hollow bones	Fishes	Gills

Fourth unit excercises

First question: Write the scientific term for each of the following statements:

1. The highest taxonomic level in taxonomic hierarchy of living organisms classification. (   )
2. A series of characteristics ordered in pairs that help the user to identify an unknown living organism. (   )
3. A type of bacteria has the ability to survive in harsh environments. (   )
4. A type of fungi produces spores inside club - shaped structures. (   )
5. Obligatory parasitic organisms , gather the characters of both living organisms and non - living things. (   )
6. The plants that their seeds produced inside a pericarp. (   )
7. The plants that have fibrous roots and paralle veined leaves. (   )
8. The aquatic animals that their bodies are provided with stinging cells. (   )
9. A type of worms that has a cylindrical body and tapered at its ends. (   )
10. Terrestrial plants live in damp soils , reproduce by spores , some are erect and others are flat. (   )

Second question: Choose the correct answer:

1. From the plants which contain cones:

A. Maize (corn) B. Pea C. Pinus D. wheat

2. From the examples of annelids (ring worms):

A. Liver fluk B. Ascaris C. Arachnids D. Earth worm

3. Prawn is belonging to class:

A. Insecta B. Crustacea C. Arachnida D. Myriapoda

4. Octopus belongs to phylum:

A. Echinodermata B. Mollusca C. Cnidaria D. Sponges

5. From the examples of echinoderms:

A. Sea urchin B. Jellyfish C. Snails D. Prawn

6 Sponge animal is belonging to phylum:

A. Cindaria B. Porifera C. Mollusca D. Arthropoda

7 From the examples of insects:

A. Hony bees B. Crab C. Sand worm D. Scorpion

8 Yeast belongs to kingdom:

A. Plantae B. Animalia C. Fungi D. Monera

9 From the characteristics of viruses , they are :

A. obligatory parasites B. saprophytes C. facultative parasites D. Autotrophic

10 From the warm - blooded animals:

A. Fishes B. Amphibians C. Mammals D. Reptiles

Third question: Give reasons for each of the following:

1 Mule is not considered a species

....

....

2 Bacteria are classified as monerans.

....

....

3 Ascaris worm is a nematoda while earth worm is an annelid.

....

....

4 Palm plant is classified as a monocotyledon.

....

....

5 Despite the bat ability to fly, it is classified as a mammal , not a bird.

....

....

6 Kangaroo is classified as a metatherian animal.

....

....

Fourth question: Compare between each pair of the following:

1

Monocotyledons	Dicotyledons
....	....
....	....
....	....

2

Birds	Reptiles
....	....
....	....
....	....

3

Insects	Arachnids
....	....
....	....
....	....

Fifth question: Classify the following organisms into their phyla and classes

1 Amoeba :

....

2 Mushroom

....

3 Trypanosoma

....

4 Toad

....

5 Jellyfish

....

6 Hawk

....

7 Honey bees

....

8 Snake

....

Miscellaneous questions:

1 What are the cnidocytes (stinging cells) ? What is the phylum that comprises animals containing these cells?

....

....

2 What are the distinguishing characteristics of birds bones which help them to fly?

....

....

3 what is the mammalian animal that keeps its young in a sac at the bottom of its abdomen ? Why?

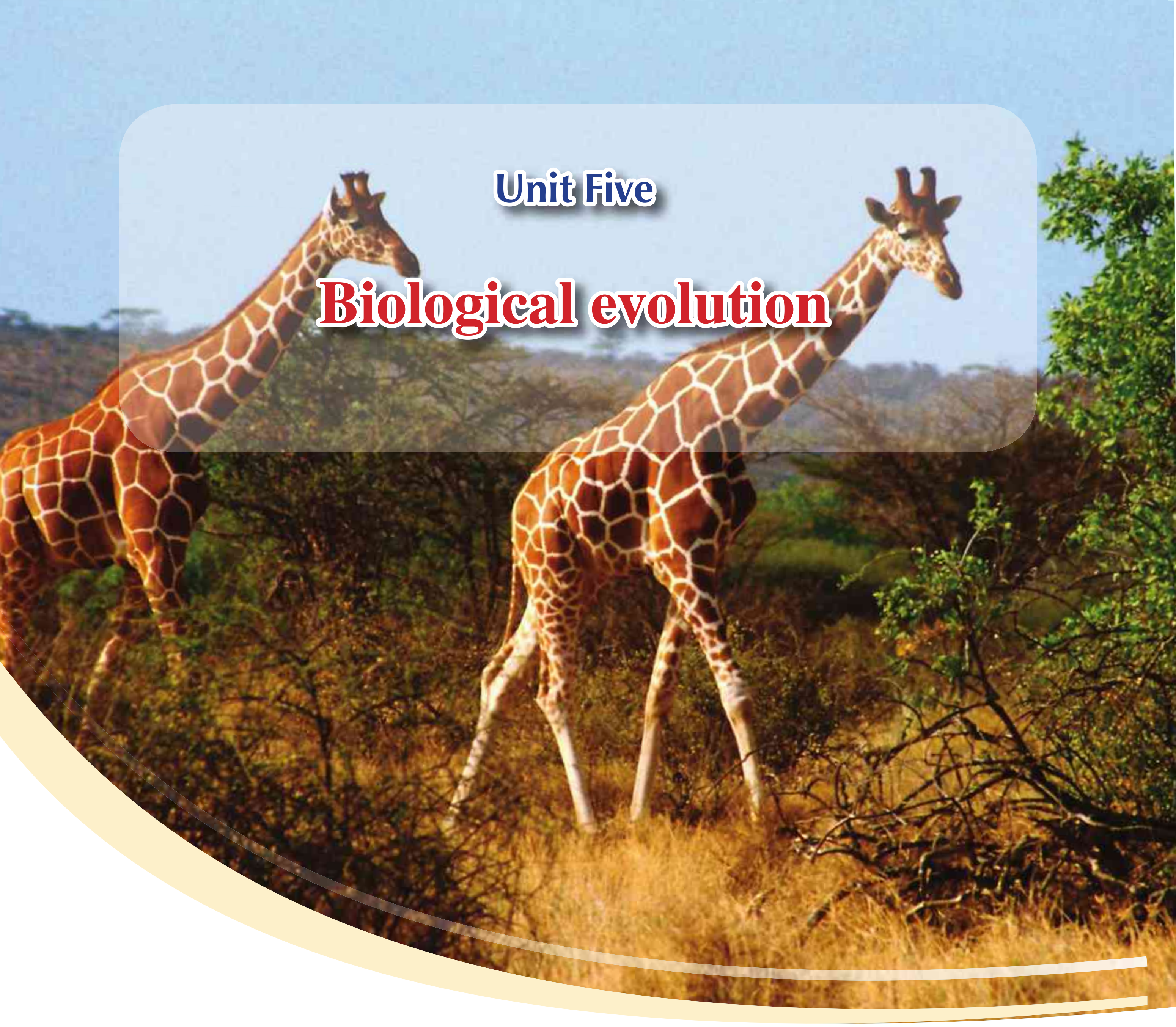
....

....

4 Mention the conditions that followed when writing the scientific names of living organisms.

....

....



Unit Five

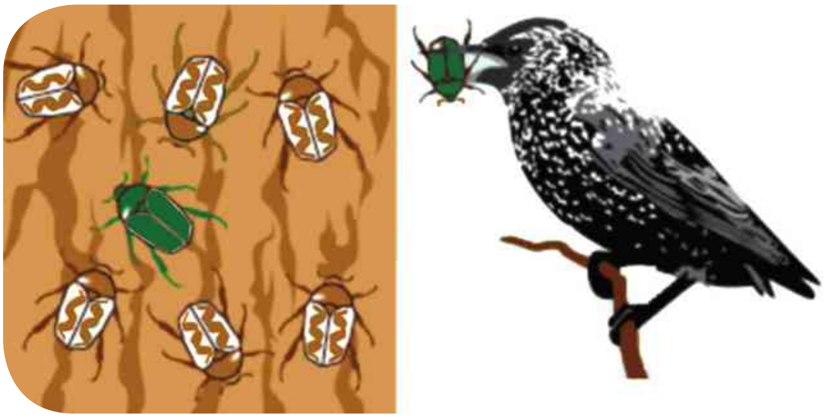
Biological evolution

Chapter 1: Origin of living organisms and mechanisms of their evolution

Chapter 2 : Evidence of evolution occurrence

Assessment activity

The following figure shows a group of different coloured insects.



- Observe ... Does the bird feed on all different insects?

....

- What are insects that the bird feed on , the light or the dark?

....

- What is your explanation for the dependence of this bird on some certain insects without the others as food?

....

....

- What do you expect to happen in the future?

....

....

- Does this lead to the genetic equilibrium?

....

- What do you conclude from this activity?

....

....

Assessment activity

The following figure shows some shapes of birds beaks:

(Heron)

(Pigeon)

(Duck)

(Hawk)

- Describe the shape of each beak and its suitable type of food in the following table:

Bird name	Beak description	The suitable type of food
Hawk	....	....
Duck	....	....
Pigeon	....	....
Heron	....	....

- What do you conclude?

....

....

....

Applied activity

A field visit to the petrified forsests in Qattameya

- Visit the natural reservation of petrified forests in Katameya accompanied by your teacher and your colleagues
- Identify the reservation and determine its geographical location ....
....
- Collect some samples which represent pieces of the petrified trees:
- Examine these specimens and record your observation in the following points.
- Shape : ....
- Size:..
- Colour: ....
- Are these samples represent plants?

  ....
- What is your explanation about the changing of plants into these petrified forms?

  ....

  ....
- What do you conclude from the existance of these petrified forests?

  ....

  ....

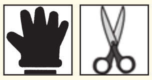
Petrified forests

Practical activity

Mould model

Procedure:

Safety precautions



Activity goal

Designing different models of fossils

Acquired skills

Designing , Innovation , Working in a team , Observing , analyzin , Applying , Concluding

Materials needed

Plastic ball with a winding surface, oil , clay , scalpel , and tree leaves

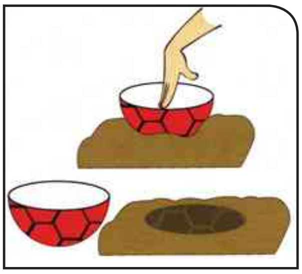


Figure (1)

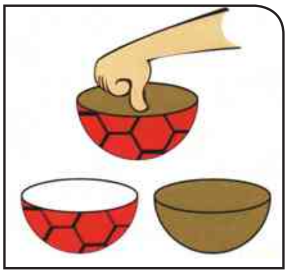


Figure (2)

1 Cut the plastic ball into 2 similar halves using the scalpel.

2 Paint the outer surface of the first half of the ball with oil and place it on the clay piece.

3 Press by your palm on the ball half even completely immersed in day , then carefully remove it , as in figure (1).

Observation :

- What do you observe on the clay piece? ....

4 Paint the inner surface of the second half with oil and fill it with clay, then carefully remove it, as in figure (2)

5 Place the leaf on the clay , then carefully press with your palm. Carefully remove the leaf

Observation :

- What do you observe on the clay piece? ....

Observation :

- What do you observe on the clay piece? ....

Conclusion :

- What do you conclude from this activity ....

Application :

- Compare between the experiment results and what is happen in nature. ....

Evaluation :

- Explain how are mould and cast fossils form? ....

A leaf cast

Applied activity

A phylogenetic tree of living organisms

Safety precautions

Activity goal

Arranging living organisms according to their evolution

Acquired skills

Designing, Innovation, Classifying, analysing, Applying, Concluding

Materials needed

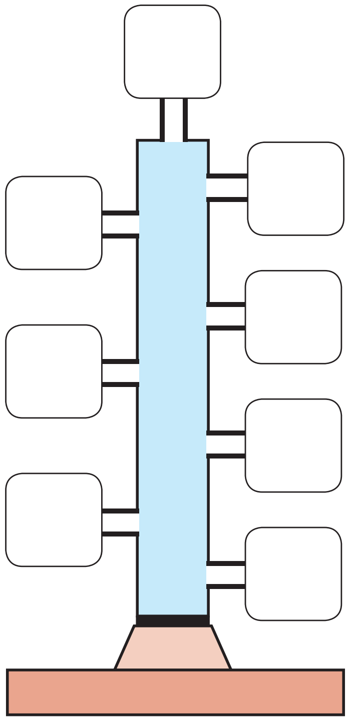
Paperboard, pencil, photos of some living organisms, adhesive material, and scissors

Procedure:

1. Design a phylogenetic tree to arrange some living organisms on it, as in the figure.
2. Write the names of living organisms in their suitable positions in the classifying tree. What is the basis that you depend on in classifying living organisms?

....

....



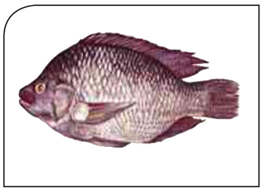
Application:

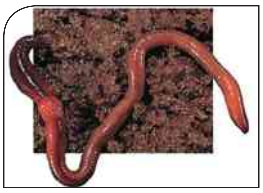
- How did the classification contribute in studying evolution?

....

....

....


Conclusion:

- What do you conclude from this activity?

....

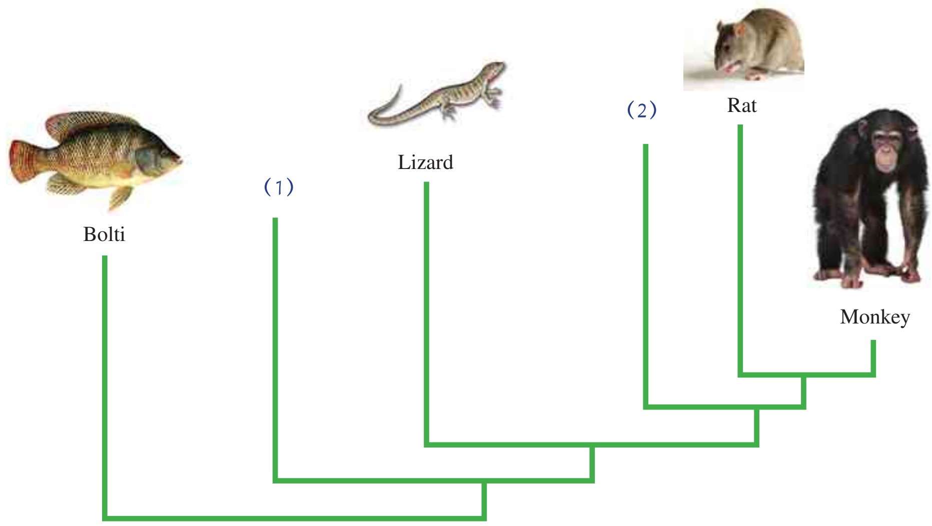
....

....

Assessment activity

Studying figures:

Examine the following figure:



Answer the following questions:

1. Write the suitable organism's name in the blanks in the figure. Give reason of your choice?

....

....

....

2.
- Which living organisms shown in the figure are considered the more developed?

....

- Which of them is less developed?: ....

3. Which living organisms shown in the figure in more relative to monkey?

....

3. On the previous figure, identify the recommended place to put *Archaeopteryx* bird.

....

Five unit excercises

First question: Choose the correct answer:

1. The theory that explains the origin of life due to the occurrence of chemical reactions between some substances is the...

A. Special creation theory. B. Universal origin of life theory.

C. Spontaneous generation theory. D. Earthly origin of life theory.

2. Urey and Miller scientists converted methane, hydrogen, ammonia, water and carbon monoxide into.........................

A. Monosaccharides. B. Disaccharidase. C. Fatty acids. D. Amino acids.

3. Some microbes acquire the ability to resist antibiotics due to the occurrence of ....

A. Mutations B. Artificial selection C. Adaptation D. Isolation

4. The beaks of Galapagos birds were developed by the action of:

A. mutatuons B. Environmental selection C. Sexual selection D. Artificial selection

5. Each of the following are conditions of genetic equilibrium, except...........

A. the mating of individuals should be at random B. The population must be large in size

C. Occurrence of mutations D. individuals should not emigrate from the population

6. Fishes get rid of their nitrogenous wastes in the form of..................

A. Ammonia B. Urea C. Uric acid D. Urea and uric acid

7. *Archaeopteryx* fossil in as intermediate link between reptiles and ....

A. Fishes B. Amphibians C. Birds D. Mammals

Second question: Write the scientific term:

1. A change takes place in the structure of hereditary materials leads to appearance of new characters. (   )
2. The remaining of the rate of any gene distribution constant in the population from generation to another, as well as the phenotypes and genotypes of this gene. (   )
3. The separation of individuals of the same species by geographical barriers as mountains and seas preventing their mating. (   )
4. Remains or traces of living organisms that lived in the old ages before the beginning of the Cenozoic era and were buried directly after their death in the sedimentary rocks. (   )
5. A fossil of an organim species, appeared and lived within a short period of

time of the Earth's geological history, then perished. It had a wide geographical distribution and many environments. (   )

6 The living organisms or fossils that possess the characteristics of two groups of living organisms. (   )

Third question: Compare between each pair of the following:

1

Theory of the cosmic universal of life	Theory of the earthly origin of life.
....	....
....	....
....	....

2

Environmental selection	Sexual selection
....	....
....	....
....	....

Fourth question : Give reasons:

1 Urey and Miller experiment helped many scientists to support the theory of the earthly origin of life.

....

2 The occurrence of genetic equilibrium requires that mating of individual in the population should be at random.

....

3 Human activities are one of the causes of extinction .

....

4 *Archaeopteryx* fossil is an intermediate link between reptiles and birds .

....

5 Adaptation of fore limbs in vertebrates .

....

6 Growth of the appendix in rabbit and its atrophy in cat .

....

Fifth question: What would happen in the following cases?

1 Occurrence of geographical isolation among the individuals of the same species.

....

2 Migration of some living organisms that have certain characteristics from the population .

....

3 Occurrence of harmful climatic changes to a species of living organisms .

....

Sixth question: **Explain the following phenomena?**

1 The sudden disappearance of dinosaurs.

....

....

2 There were great differences in the shape of birds beaks in Galapagos islands although they had the same origin.

....

....

Answer the following questions:

1 What are the conditions of occurrence of genetic equilibrium?

....

....

2 What are the reasons that lead to the variation of the individuals of the same species?

....

....

3 What in meant by extinction? What are its reasons?

....

....

4 What is meant by mutation? How does it participate in the evolution of living organisms?

....

....

5 Mention some vestigial structures in the present day man.

....

....

General tests

First test (answered)

First question: **A- Choose the correct answer:**

1. The lower level of classifying living organisms is the ....
(Kingdom - phylum - class - species)
2. The chromosomal structure of turner's syndrome is ....
(44+XX) - (44+XXY) - (44+X0) - (44+XXX)
3. Both plant and animal cells are characterized by the presence of ....
(chloroplasts - cell wall - centrosome - nucleus)
4. Which of the following is not of organic biological molecules?
(nucleic - acids - carbohydrates - water - proteins)
5. Urey and Miller scientists were able to convert methane, hydrogen, ammonia, water and carbon monoxide into ....
(Fatty acids - amino acids - monosaccharides - starch)

B- Give reasons :

1. Mitochondria are abundant in muscle cells.
2. Dawn's syndrome affects both sexes.
3. *Archaeopteryx* is an intermediate link.
4. Water molecule is a polar molecule.

Second questions: **A- Write the scientific term for each statement of the following:**

1. Arranging living organisms in groups according to the similarities and differences among them to facilitate studying and identifying them.
2. A change takes place in structure of the hereditary material leading to appearance of new traits.
3. The points of attachment of internal chromatids in the homologous chromosomes.
4. The building and functional unit of the living organisms.

B- What would happen in the following cases?

1. Leaving a wet piece of bread in a warm place for several days.
2. Burying a living organism in a medium completely isolated from air and water.
3. The temperature is raised above the optimal temperature of the enzyme activity.
4. Mating of yellow mice.
5. Placing red blood corpuscles in a hypotonic solution.

Third question: **A- Choose from statement of column (A) what suits that of column (B):**

(A)	(B)
1- Eukaryotic organisms, heterotrophic, their bodies consist of interlaced filaments called hyphae.	a- Mammals
2- Plants reproduce by cones and their seed are not enclosed by pericarbs.	b- Porifers
3- Warm- blooded animals, their bodies are covered with feathers.	c- Amphibians
4- Cold - blooded animals, their embryological stages breathe by gills, and adults breathe atmospheric air by lungs and skin.	d- Birds
5- Simple structured aquatic animals, their bodies contain many pores and canals.	e- conifers
	f- Fungi

B- Write a brief note for each of the following :

1 The conditions by which the scientific names of living orgnaisms are written.

2 Cell theory.

3 Spontaneous generation theory.

4 The karyotype

5 Functions of nucleic acids.

Fourth question: **Correct the underlined words in the following statements :**

1 The genus is a group of individuals that have similar morphological characteristics, and mate together to produce fertile offspring similar to them.

2 In case of complementary genes, the ratio in second generation is 9:3:3:1 .

3 Cell division takes place under control of ribosomes.

4 Amylase is a compound enzyme .

5 Plasma membrane separates cytoplasm from the nucleus contents.

B- Compare between each pair of the following :

1 Nematodes and Annelids.

2 Passive transport and active transport.

3 The appendix in rabbit and man.

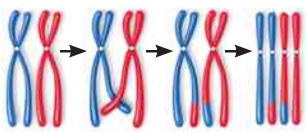
4 Blood group (A) and blood group (B).

Fifth question:

A- the opposite figure illustrates a phenomenon takes place during cell division. Answer the following questions:

1 What is the name of this phenomenon? When it happens?

2 What are the results of occurring of this phenomenon?



B- Classify the following living organisms:

1 Spider.

2 Jelly fish.

Second test (answered)

First question: **A- Choose the correct answer:**

1. All the following are functions of endoplasmic reticulum except ....
   (Energy production - proteins ynthesis - producing cell secretion - connecting cell parts)
2. The chromosomal structure of klinefelter's syndrome is ....
   (44+XXX) – (44+XO) – (44+XXY) – (44+XX)
3. An example of anorganism belonging to monerans is ....
   (bacteria - yeast - *Amoeba* - *Paramecium*)
4. Nucleic acids consist of: (glucose - fatty acids - amino acids - nucleotides)
5. Birds get rid of their nitrogenous wastes in the form of ....
   (ammonia - urea - carbonic acid - uric acid)

B- Give reasons for :

1. Bacteria are eukaryotic organisms.
2. Naming of vascular plants (trachaeophytes) by this name.
3. Presence of a nictating membrane in eyes of reptiles and birds.
4. Despite the number of amino acids does not exceed 20, there are millions kinds of proteins.

Second question: **Write a scientific term for each statement of the following:**

1. A microscope depends upon electrons to magnify the objects.
2. Creatures that gather the characteristics of living organisms and non-living things.
3. The molecule resulted from linking of tow monosaccharid molecules by a glucoside bond.
4. Some genes, when found in homozygous states lead to retardation of growth and cause death to one fourth of offspring at different stages of life.

B- What would happen in the following cases?

1. Decomposition of lysosomes membrane inside the cell.
2. Occurrence of mating between a female lion and a male tiger.
3. Changing the type of an amino acid in a certain protein.
4. Fertilization of an ovum (22+XX) by a sperm (22+Y)

Third question:

A- Choose from statements of column (B) what suits that of column (A):

(A) The mechanism	(B) Explanation
1- Natural selection	a- An evolutionary power acts with natural selection to change the characteristics of species in the small populations.
2- Evolution	b- Variation between the individuals of the same species that helps them for surviving.
3- Genetic drift	C- Separating the individuals of the same species by geographical barriers such as mountains and seas preventing their mating.
4- Adaptation	d- A change taking place in the hereditary material leading to appearance of new characteristics.
5- Isolation	e- Selecting the individuals able to adapt with environmental conditions as a result of accumulution of inherited characteristics that help to survive.
	f- The suitability of any structure in the body of living organism to its function.

B- Write a brief account for each of the following :

1. Mosses (Bryophytes).
2. The karyotype.
3. Crossing over.
4. Parenchyma tissue.

Fourth question: A- Correct the underlined words in the following statements:

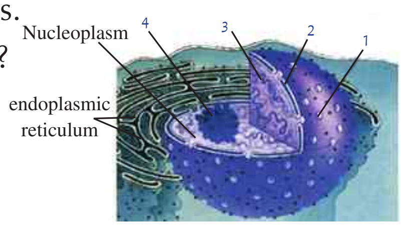
1. Mitochondrion is the cellular structure that controls cell division.
2. *Paramecium* moves by pseudopodia, whereas trypanosoma moves by flagella.
3. From mould fossils is fish bones.
4. The primary structure of protein describes the three dimensional shape of protien.
5. Chlorophyll appearance is affected by the temperature factor.

B- Compare between each pair of the following :

1. Blood group (AB) and blood group (O) .
2. Universal origin of life theory and earthal origin of life theory.
3. Photosynthesis and respiration.

Fifth question: A- Examine the opposite figure, then answer the following questions:

1. What is the name of this organelle? What is its importance?
2. Write down the labels that indicated by the numbers.
3. What happens to structure no.3 during cell division?



B- Classify the following living organisms:

1. *Bilharzia* worms.
2. Octopus.

Third test

First question: **A- Choose the correct answer:**

1. The cell can be magnified a million times of its original size using the ....
   (light microscope - electron microscope - centrifuge - hand lens)
2. The chromosomal structure of a female suffered from dawn's syndrome is ....
   (45+XX) - (44+ XXY) - (45+ XY) - (44+XXX)
3. Carbohydrates are absorbed from intestine in the form of ....
   (monosaccharides - disaccharides - polysaccharides - simple sugars)
4. Euglena is classified into kingdom ....
   (Monera - Protista - Plantae - Animalia)
5. The depression left by the body of dead organism when it touches soft sediment is called the .... (mould - cast - track - petrified remains)

B- Give reasons for each of the following :

1. Ribosomes play an important role in the cell.
2. Bean plant is classified into dicotyledon plants.
3. The decomposition of albumin protein produces amino acids only.

Second questions: **Write down the scientific term for each of the following:**

1. Cellular structures responsible for decomposing of senile and worn organelles.
2. Creatures that gather characteristics of living organisms and non-living things.
3. Exchanging some pieces having genes between the internal chromatids.
4. Separating the individuals of the same species by geographical barriers such as mountains and seas preventing their mating together.

B- What would happen in each of the following cases

1. Removing the nucleus from the cell.
2. Non-existance of classification of living organisms.
3. Crossing of *Antirrhinum* plants carrying red flowers and other carrying white flowers.
4. The colouration of insects with the colour of environment in which they live.

Third question: **Choose from statements of column (A) what suits that of column (B):**

(A)	(B)
1- A thin membrane surrounds cytoplasm, and controls the passing of substances from and into the cell	a- Golgi bodies
2- A type of plant tissues specialized in transporting water and salts from roots to leaves	b- Plasma membrane
3- Rod-shaped structures consist of the nucleic acid DNA twisting around molecules of protein.	c- Chloroplasts
4- A group of round-ended flattened membranous sacs abundant in secretory cells.	d- Xylem
5- Cellular structures found only in plant cells and responsible for photosynthesis.	e- Chromosomes
	f- Cell wall

B- Write a brief note for each of the following :

1 Prokaryotic cells.
2 Sex-linked characteristics.
3 Mutation.
4 Water polarity.

Fourth question: **Correct the underlined words in the following statements**

1 In transmission electron microscope, electrons scan the outside surface of the body without permeating into its inside.
2 From the examples of the sex-influenced traits is haemophilia.
3 Anabolic reactions produce energy.
4 Earth worm belongs to phylum Nematoda.
5 From the examples of the entire organisms fossils is the fossil of dinosaur.

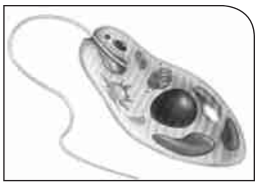
B- Compare between each pair of the following :

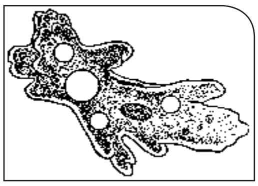
1 Chloroplastids and mitochondria.
2 The index fossil and transitional fossil.
3 Monocotyledon and dicotyledon plants.
4 Klinefelter's syndrome and Turner's syndrome.

Fifth question: **A- Examine the organisms shown, then answer the following questions**

1 Identify an organism and mention its phylum.
2 Determine the mean of locomotion in each organism.

B- A colour-blind healthy man married a healthy woman. They gave birth 4 children, a colour blind male and 3 healthy females. Explain this case using a pedigree.


(A)


(B)

Fourth test

First question: Choose the correct answer:

1. From the examples of prokaryotic cells is the ....

(bacteria - plant cell - animal cell - *Amoeba*)

2. Monocotyledon plants are characterized by ....

(fibrous roots - parallel viened leaves - triple floral whorls- all the previous)

3. The inheritance of milk secretion in cattle is an example of .... characteristics

(sex-linked - sex-influenced - sex-limited - Mendelian)

4. The sugars responsible for energy transport processes inside living organisms is the ....

(monosaccharides - disaccharides - polysaccharides - simple sugars)

B- Give reasons:

1. Mitochondria are centres of energy production in the cell.
2. When two individuals differ in a pair of hereditary characteristics mate, the ratio in the second generation is 1:2:1, and is not 3:1.
3. The type of anibiotic must be changed every time period.
4. Water specific heat is more essential for living organisms.

Second question: Write the scientific term for each of the following

1. Diffusion of water across cell membrane from a medium with a low concentration of dissolved substances to another with a high concentration.
2. A type of worms, their bodies are divided into segments (rings).
3. A type of antigens found on surface of red blood cells that may cause abortion to the pregnant woman.
4. Remains or traces of living organisms that lived in the old ages before the beginning of the Cenozoic era and were buried after death in sedimentary rocks.
5. The site of binding a substance with an enzyme during a reaction.

B- What would happen in the following cases?

1. Animal cell does not contain a centrosome.
2. Some drops of Benidict's reagent were added to a monosaccharide.
3. Blood is transfused from a person with blood group (A) into another one with blood group (O).
4. Migration of some living organisms which have certain characteristics from a population.

third question: **A- choose from statements of column (B) what suits that of colum (A):**

(A) The substance	(B) units of structure
1- starch	A-consists of nucleotides
2- proteins	B- consists of fatty acids
3- Fats	C- consists of amino acids
4- Nucleieacids	D- consists of glucose sub-units
	F- consists of inorganic salts

B- Write a brief note about each of the following :

1 Bulk movement.
2 Metatheria.
3 Spontaneaus generation theory.
4 The pedigree.
5 Protein importance.

Fourth question: **A- Correct the underlined words in the following statements**

1 The prokaryotic cell has no nuclear membrane and all cellular organelles except mitochondria.
2 Scorpion belongs to class Crustacea which is a class of phylum arthopoda.
3 Crossing over takes place in the metaphase of the first meiotic division.
4 Fishes get rid of nitrogenous wastes in the form of uric acid.

B- Compare between each pair of the following :

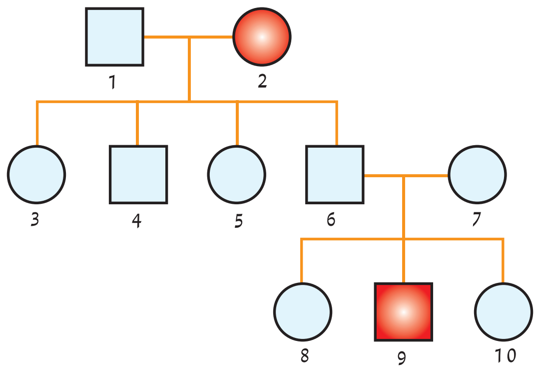
1 Insects and arachnids.
3 Ribosmes and lysosomes.
2 Antigens (A) and antibodies (a).

Fifth question: **The following figure shows a pedigree for the presence of freckle in the face.**

1 Is this trait is dominant or recessive? Why?
2 What is the possible genotype for individuals no. 1, 2, 6, 7 and 9 .

B- Classify the following living organisms:

1 Shark fish.
2 Bean plant



Fifth Test

First Question: **A choose the correct answer**

1 The tissue responsible for transporting substances produced during photosynthesis from the leaves into all other plant parts is the .... tissue

(xylem - phloem - parenchyma - collenchyma)

2 All the following are properties of viruses exept they are ....

(variously shaped - obligatory parasites - specific - autotrophic)

3 Blood group (AB) is a case of ....

(lethal genes - complemenary genes - sex - influenced genes - lack of dominance)

4 The lipids formed by reacting of saturated fatty acids whith glycerol are the........

(oils - fats - waxes - cholesterol)

5 The beaks of Galapagos birds were devolped by the action of the ....

(environmental selection - mutations - sexual selection - artificial selection)

B- Give reasons for each of the following :

1 Plasma membrane has an important role in the cell.

2 Fishes are considered ectothermic (cold - bloodedy) animals.

3 Enviromental selection differs from sexual selection.

4 Water has a high specific heat.

Second question: **A. Write the scientific term for each of the following:**

1 Cellular structures that represent the center of vital activity in the cell..

2 A group of mammals that gives no birth, but they lay eggs and incubate them.

3 The genetic data displayed in the form of a diagram showing how a certain trait is inherited and benefits in following up the different traits.

4 Using of simple molecules resulted from anabolism of more complex substances through a series of reactions using energy.

5 A fossil used in correlation between layers of sedimeutary rocks to determine their relative age.

B- What would happen in the following cases?

1 The cell does not contain ribosomes.

2 Reaching of some stages of *Plasmodium* parasite into human blood.

3 Rising of the stomach acidity above the optimal pH value of its enzymes to work.

4 Crossing of yellow mice together.

Third question: A- Choose from statements of column (B) what suits that of column (A):

(A)	(B)
1- Flowers colour chracteristic of pea flower plants	a- lack of dominance.
2- Colour blindness trait in humans	b- lethal genes.
3- Yellow colour trait of mice	c- Complementary genes.
4- Flowers colour characteristic of *Antirrhinum* plants	d- Sex-linked traits.
5- Milk secretion trait in females of some mammals	e-sex-influenced traits.
	f- sex-limited traits.

B- Write a short note about each of the following :

1 Nematodes. 2 cell wall. 3 Petrified remains.
4 Rhesus factor. 5 Functions of lipids.

Fourth question: A- Correct the underlined words in the following statements

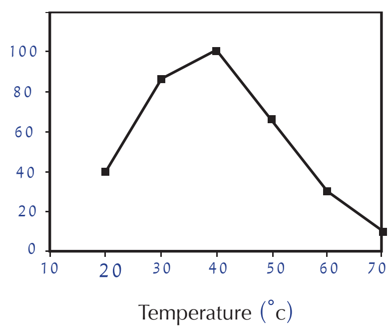
1 The digestive enzymes in the cell are found inside membranous sacs called <u>ribosomes</u>.
2 There are seven levels for classifying living organisms that begin with <u>phylum</u> and finished with species.
3 The white hair in Himalayan rabbits is affected by the <u>light</u> factor.
4 Glycogen is a simple sugar.
5 Appendix grows in carnivores.

B- Compare between each pair of the following :

1 Cartilagenous and bony fishes.
2 Epithelial and connective tissues.

Fifth question: A- The following figure shows the relatim between temperature and activity of an enzyme. Determine:

- The temperature at which the enzyme activity begins.
- The temperature at which the enzyme activity ends.
- The thermal range of enzyme activity.
- The optimal temperature of enzyme activity.



B- A man with blood group (A) married a woman with blood group (O), what are the expected blood groups of their offspring? Show this by genetic analysis.

Model answer of first test

Answer of first question: A 1 species . 2 (44+x0). 3 nucleus. 4 water. 5 amino acids.

B- 1 To increase production of energy needed by muscles.

2 Because the error takes place in autosomes (the somatic chromosome pair no.21), not the sex chromosomes.

3 Because it gathers between the characteristics of birds (presence of a beak, wings and feathers) and that of reptiles (presence of teeth in beak, claws in wings, and bony vertebrae in tail).

4 Because it carries negative charges towards oxygen atom, and postive charges towards the 2 hydrogen atoms, so this helps in dissolving inorganic salts (polar).

Answer of second question:A- 1 Classfication of living argonisms. 2 Mutation. 3 Chiasmata.

4 Cell.

B- 1 The spores of bread mould fungus grow and cause its putrification.

2 An entire fossil is formed.

3 The enzyme activity decreases.

4 25 % of the resulted generation die inside mother's uterus because they carry dominant lethal characteristics in a homozygous state.

5 The cells swell, then burst due to transference of water from the external medium to the inside of cells across cell membrane by osmosis.

Answer of third question:

A- 1 f 2 e 3 d 4 c 5 b

B- 1 The conditions by which scientific names of living organisms are writeten:

- Written by Latin language.
- Each organism given a binomial name, the first name is the genus that begins with a capital letter, and the second one is the species which begins with a small letter.
- Then names written with tilted Latin letters, or each of them is underlined to distiguish them from other words.

2 **Cell Theory:** It is considered as one of the most important theories in recent biology. It includes the following three principles:

- Cells are the basic functional units of all living organisms.
- All living organism consist of cells, that may be individual or aggregated state.
- All cells come only from pre-existing living cells.

3 **The karyotype:** is the arrangement of chromosomes descendingly according their size and numerating them form 1-23, and differs in the male from the female in the pair of sex chromosomes.

4 **Functions of nucleic acids:**

- DNA: - passing the chromosomes from a generation to another during cell division.

  - Organizing the vital activities of cells.

- RNA: synthesis of proteins that resposible for the appearance of traits and controlling vital activities.

Answer of fourth question: A- 1 species 2 9 :7 3 nucleus 4 Simple 5 nuclear envelope

B- 1

	Nematodes	Annelids
The body	The body is cylindrical with tapered ends	The body is divided into segments (rings) and many have chaetae buried in skin.
Way of living	Some are free-living and others are parasites.	The majority are free living, and the little are external parasites.
Examples	*Ascaris*	Earth worm, sand worm and medical leech

2

Passive transport	Active transport
It is the movement of substances through cell membrane down their concentration gradient	is the transporting of molecules or ions through cell membrane against their conentration gradient, i-e from a low concendration medium to a high concentration one
Does not require energy	Requires energy

3

Rabbit's appendix	Man's appendix
Growing	Atrophied

4

Blood group (A)	Blood group (B)
1- It contains antigens (A). 2- It contains anti-b 3- It has two possible genotypes: AA and AO. 4- It receives blood from groups (A) and (O). 5- It donates blood to groups (A) and (AB)	1- It contains antigens (B). 2- It contains anti-a 3- It has two possible genotypes: BB and BO. 4- It receives blood from groups (B) and (O). 5- It donates blood to groups (B) and (AB)

- Anwer of fifth question: A- 1 Chiasma and crossing over: It happens during the prophase of the first miotic division.

2 Exchange of parts of chromatides occurs along with its genes, leading to variation of gametes that resulting in variation of individuals.

B- 1 Classification of the spider (kingdom: Animalia - phylum : Arthropoda - class: Arachnida)

2 Classification of jellyfish (kingdom: Animalia - phylum: Cnidaria - class: Scyphozoa).

Model answer of second test

Answer of first question:

A- 1 energy production. 2 (44+xxy). 3 bacteria. 4 nucleotides. 5 uric acid.

B- 1 Because its genetic material is not surrounded with a nuclear envelpe, as well as most cellular organelles are absent.

2 Because they contain specific tissues for transporting water and salts (xylem), and others for transporting of nutrients (phloem).

3 To protect the eye from dust, sand and intense light.

4 Because proteins differ in number, types and arrangement of amino acids.

Answer of second question: A- 1 Electron microscope 2 Viruses.
3 Disaccharide. 4 Lethal genes.

B- 1 The cell decomposes due to the releasing of digestive enzymes from lysosomes into cytoplasm.

2 Tigon is produced. It is a sterile individual, unable to mate.

3 The type of protein changes. 4 Klinefelter's syndrome is produced.

Answer of third question:

A- 1 e 2 d 3 a 4 f 5 c

B- 1 **Mosses (Bryophytes)**: They are terrestrial plants, contain no vascular tissues, need dampness greatly to grow and reproduce, so they live in damp soils and shady places. They are small-sized green plants, carry hairs for anchoring. These hairs are considered rhizoids. Some are flat such as *Riccia*, while other are erect such as *Funaria*.

2 **Crossing over**: Is exchanging of parts of chramtids in the pair of homologous chromosomes during prophase I of meiosis that resulting in variotion of gametes and consequently variation of individuals.

3 **Karyotype**: Is the descending arrangement of chromosoms according to their size and numerating them from 1 - 23, and it differs in male from female in the pair of sex - chromosomes.

4 **Parenchyma tissue**: A simple plant tissue, its cells are oval or rounded- shaped with thin walls and intercellular spaces for aeration. Its cells contain chloroplastids, chromoplastids, or leucoplastids. It performs several functions such as photosynthesis and storing food stuffs such as starch.

Answer of fourth question:

A- 1 Nucleus. 2 Cilia. 3 Ammonite. 4 Tertiary protein. 5 Light.

B- 1

Blood group AB	Blood group O
1- Represents a case of lack of dominance. 2- Its genotype is AB 3- It carries both types of antigens: A and B 4- It carries no antibodies 5- It is a universal receiver	1- Represents the recessive trait (complete dominance) 2- Its genotype is OO 3- It carries no antigens 4- It carries both types of antibodies: anti-a and anti-b 5- It is a universal donor

2

Universal origin of life theory	Earthly origin of life theory
Life is transferred from the space into earth in a form of germs that lived in a heavenly body such as a meteor.	Life is originated among chemical reactions of earth's crust components (long and complex reactions) resulted in the formation of amino acids that form the protoplasm.

3

	Photosynthesis	Cellular respiration
Function	Storing energy	Releasing energy
Location	Chloroplastids	Mitochondria
Reactants	Water and CO_2	Glucose and O_2
Products	Glucose and O_2	Water and CO_2
Equation	CO_2 + water → glucos + oxygen	Glucose + oxygen → CO_2 + water + energy

Answer of fifth question:

A 1 **The nucleus; its function is**::

- It is a control centre in all cell activities.
- It contains chromosomes that responsible for transmission of hereditary characteristics.
- It controls cell division.
- It contains the nucleolus responsible for formation of ribosomes which plays an important role in protein synthesis.

2 1- nuclear pore 2- nuclear envelope. 3- chromatin 4- Nucleolus

3 Chromatin is converted during cell division into rod-like structures called chromosomes. The chromosome appears, in metaphase, forming of two filaments attached together at a central part called centromere . Each filament is called chromatid.

B 1 Kingdom: Animalia - phylum: Platyhelminthes - class: Trematoda.

2 Kingdom: Animalia - Phylum: Mollusca- class: Cephalopoda.

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Dear Student

- Competing with yourself is the best competition.
- He who believes in Allah is rewarded.
- He who lives in fear will never be free.
- Praise your friend in public and blame him secretly.
- Choose your words before speaking.
- Only people can free themselves and achieve their dreams.