

CLIL MultiKey lesson plan

LESSON PLAN

Subject: Biology

Topic: Nutrition

Age of students:16-18

Language level: B1+;B2

Time: 45 min

Lesson 1 Nutrition of Plants.

Content aims:

After completing the lesson, the students will be able to:
Distinguish the properties of living and non-living things.
Differentiate plant and animal cell.
Describe the processes of plant nutrition.
Explain how plants get their food.
List nutrients that plants need to grow.
Define what photosynthesis is.
Apply knowledge to do tasks about plant nutrition.

Language aims:

After completing the lesson, the students will be able to:
Use vocabulary necessary for the description of living beings.



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Key words: *Nurture, nutrition, nutrients, nutritional value, absorb, absorption, breakdown, products, release, metabolism, chemical bonds, activation energy, catalysts, enzymes, starch, selective, transport, intake, stomata.*

Materials: - Biology for IGCSE, Mary Jones, Heinemann; Key Stage 3 Science, The revision guide (Levels 5-7) Edited by Richard Parsons, Coordination Group Publications; Science Additional Science Revision Guide (Higher for GCSE), Pearson 2012.

- Overhead projector;
- Computer;
- Internet connection.

Pre-requisites: students' prior knowledge about plant nutrition.

Procedure steps:

1. Brainstorm activity „What are the properties of the living things?“ (Students discuss in groups, then teacher writes on the table. There should be pointed out the following life processes: Movement, respiration, sensitivity, nutrition, excretion, reproduction, growth. The order is important, because there is the possibility to make an acronym **Mrs. Nerg**, where each letter stands for a process. Students take notes, write down the names of processes). (Attachment 1.)

2. Introductory talk. The teacher puts forward the following questions: -What is the difference of the plant and animal cell? Common? (Both have cell membrane, nucleus cytoplasm and mitochondria; only plant cells have cell wall, chloroplasts and large central vacuole. Every cell has a cell surface membrane. It controls what goes in and out of the cell. Cell surface membranes are very flexible, so they allow the cell to change shape.)

Students take notes.

*Option: add a short video-**Introduction to cells**-[https://www.youtube.com/watch?v=gFuEo2ccTPA\(2:54min\)](https://www.youtube.com/watch?v=gFuEo2ccTPA(2:54min))

3. The teacher starts the talk about plant nutrition:

- The teacher points out that first they will talk about plant nutrition.
- The teacher revises with the students the parts of a plant. (Attachment 2-handout for students).



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- The teacher puts forward the following questions. Students have to write them down.

-How do plants get their food?

-What nutrients do plants need to grow?

- What is photosynthesis?

- Students are offered a presentation. While watching, they have to listen and take notes.

4.Students' presentation „Plant nutrition”.(12-15 min).

5.Students evaluate the **presentation**.(Attachment 3, teacher's material).

6.Teacher checks the notes, students read out loudly their answers.

7.The students are offered **tasks** about plant nutrition.(Attachment 4. Handouts with tasks for students).

8.The teacher notes that plants and animals are connected in food chain and the next lesson will be devoted to human nutrition.

Attachments:(Material for teachers)



The Variety of Life

Biology is the study of living organisms. Living organisms have a number of characteristics that make them different from non-living things. Biologists classify living organisms into groups, to make them easier to study.

Living and non-living things

If you look around you, you can probably see a number of living and non-living things. It is usually easy to tell which are alive and which are not. People, for example, are obviously alive because they move around. Plants are obviously alive because they grow.



Figure 1.1 ■
What can you see here that is alive?
What is not alive? How can you tell?

Living things are called **organisms**. Living organisms have seven characteristics that make them different from non-living things:

- 1 Living organisms **feed**. They need to take in substances from their surroundings. They use these substances for growth, or as a source of energy. Animals and plants feed in very different ways, as you will see in chapters 5 and 6. Another word for feeding is **nutrition**.
- 2 Living organisms **respire**. This means that they break down food inside their cells, sometimes by combining it with oxygen. This releases energy from the food, and the organisms can use this energy to carry out processes 3 to 7.

3 Living organisms **move**. This is very easy to see in most animals, but it is not easy to see a plant moving! Most plants are rooted to the ground, so the whole plant cannot move. But parts of plants may move slowly. Perhaps only the contents of their cells move, so that you can only see the movement under the microscope.

4 Living organisms **excrete**. Chemical reactions take place inside the cells of an organism. Some of the substances made by these reactions are poisonous, so the organism needs to get rid of them. Getting rid of these substances is called excretion.

5 Living organisms **grow**. Some of the food they take in is used to help cells to grow, and to build new cells, so that the organism gets larger.

6 Living organisms **reproduce**. Every kind of living organism is able to make new organisms like itself.

7 Living organisms are **sensitive** to things around them. All living organisms can sense changes in their surroundings, and respond to them. This is sometimes called **irritability**. The changes they sense are of many types, such as changes in temperature, light intensity, sound, day length and the presence of chemicals.

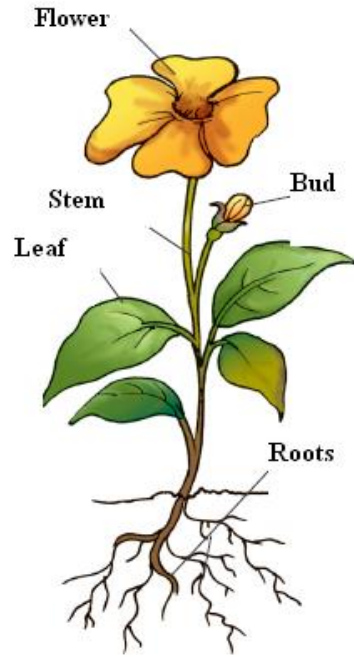
Question

- 1.1 The engine of a car uses petrol (gasoline). Oxygen from the air combines with the petrol, releasing energy which is used to turn the wheels of the car. Waste gases from the burnt petrol are given off in the exhaust fumes of the car.

- a Which characteristics of a car are similar to which characteristics of living organisms?
- b Explain why a car is not a living organism.

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Attachment 1.↑ (Material for teachers)



Attachment 2.(Handout for students).

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Presentation evaluation

Variant A

	Criteria	excellent	4 good	3 satisfactory	2 almost satisfactory	1 unsatisfactory	Score
CONTENT LANGUAGE	concepts <i>ti-</i> ples	acquired <i>all</i> the basic concepts and principles of the topic	acquired <i>most</i> of the concepts and ples of the of the	acquired <i>some</i> basic concepts and principles of the topic	acquired <i>only a few</i> concepts and principles of the topic	acquired <i>none</i> of the concepts and principles of the topic	
	narration	Well structured, correct and <i>comp</i> <i>comprehensive</i> explanation; narra nation;	<i>generally</i> well- struct ured, correct explanation;	<i>ient</i> explanation, with a <i>d number of errors</i> ; <i>d</i> personal evaluation	explanation shows <i>some deficiencies</i> in narration and logical formulation	explanation is <i>severely inconsistent</i> in terms of structuring and formulation;	
	accuracy	Consi consistent <i>gramatical</i> <i>tr</i> control and appropriate use of <i>vocabulary</i>	<i>grammatical control</i> <i>generally</i> appropriate, use of relevant <i>vocabulary</i>	<i>mistakes</i> in grammar in vocabulary use do cause misunderstanding	makes <i>mistakes</i> in grammar and vocabulary , but the language is generally lear	systematic grammar mistakes and the narrow range of vocabulary make the message meaningless	
	fluency & -ter action	Can epresses him/her self with in <i>natural flow</i> and interacts <i>with ease</i>	expresses him/her self with ease and interacts with <i>a</i> degree of fluency	expresses him/her self and interac s with <i>a reasonable</i> degree of fluency	manages the discourse and and interaction <i>with</i> effort and must be helped	communication is totally dependent on repetition, asking and repair	

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Attachment 4.(For students).

Task 1.Match the parts of sentences. Write in the correct word in front of the sentence. The first one is an example.

Glucose	1	chlorophyll	is the green pigment in plants.
Stomata	2		and chlorophyll work together in photosynthesis.
Minerals	3		and water are made into glucose and oxygen.
Sunlight	4		allow carbon dioxide to enter the plant from the air.
Chlorophyll	5		is the food made by the plant.
Carbon dioxide	6		and water are absorbed through the roots.
Starch	7		are made from glucose and minerals.
Proteins and fats	8		is also made from glucose and stored in plants.

Key :(for teachers)

Glucose	1	Chlorophyll	is the green pigment in plants.
Stomata	2	Sunlight	and chlorophyll work together in photosynthesis.
Minerals	3	Carbon dioxide	and water are made into glucose and oxygen.
Sunlight	4	Stomata	allow carbon dioxide to enter the plant from the air.
Chlorophyll	5	Glucose	is the food made by the plant.
Carbon dioxide	6	Minerals	and water are absorbed through the roots.
Starch	7	Proteins and fats	are made from glucose and minerals.
Proteins and fats	8	Starch	is also made from glucose and stored in plants.



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Task 2

Insert the words in the blank spaces.

Unable, chlorophyll, stomata, energy, glucose, photosynthesis, light, food chains.

Green plants make their food in the presence of 1. by process called photosynthesis. This is the start of 2. of living things. Animals are 3. to make their own food so they eat plants or other animals to get food they need. The animals they eat may have eaten plants , or other animals that ate plants. Ultimately all food comes from the food made by plants in 4. , and all 5. in food comes from sunlight. During photosynthesis 6., the green pigment in plants, traps the energy from sunlight and uses it to join carbon dioxide and water to make 7. and oxygen. Carbon dioxide enters the plant from the air through small holes in the leaf called the 8.

Key

1.light 2.food chain 3.unable 4.photosynthesis 5.energy 6.chlorophyll 7.glucose 8.stomata

Attachment 5. (Can be used for all lessons).

. Self-assessment.(Students' self-evaluation form. Tick the relevant answer!)

My knowledge of the language :

- was enough
- was not enough
- improved
- did not improve

My knowledge of the subject:

- was enough
- was not enough
- improved
- did not improve



CLIL MultiKey lesson plan

Lesson 2. Human nutrition, nutrients, processes in cells.

Subject: Biology

Topic: Nutrition

Age of students: 16-18

Language level: B1+;B2

Time: 45 min

Content aims:

After completing the lesson, the student will be able to:

Distinguish nutrients and their role.

Explain why we need nutrients.

Describe chemical reactions within cells

Apply systematic knowledge about nutrition process on cell level.

Illustrate what metabolism is.

List factors that affect the work of enzymes.

Language aim:

After completing the lesson, the student will be able to:

Analyze what nutrients living things need to exist.

Key words: nutrients, to sustain, fibre, roughage, metabolism, reactants, enzyme, acid(ic), affected by, intake, to provide.

Pre-requisites: - students prior knowledge about human nutrition in L1.



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1.In-class talk about nutrition and nutrients. Students together with teacher recall what nutrients we need to sustain life.

(We need: carbohydrates for growth, they are fuel, energy source; proteins for growth and repair; fats serve as a store of energy; vitamins help to keep processes happening; minerals for blood,teeth,bones and nerves; water –it is where all chemical reactions in your body happen; roughage(fibre) gives your digestive system internal workout).

Teacher gives the final conclusion why we need nutrients (can be pointed out on the board): we get energy (to keep body warm to enable movement ;we need to provide materials for building cells; we need material to make chemical reactions take place in our bodies.

2.Gap-filling activity. Students fill in the gaps in the handouts about nutrients.(Handout 1). After – reading out loudly by students.

3. The teacher **asks** how the living organism can use/consume nutrients. The students can answer that nutrients „come into” (enter) our body via digestive organs (mouth, stomach). The teacher leads students to the idea how nutrients are used after, on cell level. What helps it. The teacher suggests reading the text and finding out about these processes.

4.Reading.”Cells and chemistry”.(Handout2). Students read silently, write down answers in their notes. Teacher checks the answers at the end.)



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Attachments: Handout 1.1.1. Label the nutrients(1-6): water, minerals, vitamins, fats, carbohydrates, proteins.

1.2. Insert the missing words!(A,B,C,D,E,F)

Nutrition

Nutrition is what you eat — and what you eat is really important for your health.
A balanced diet will have foods from all of the seven groups below — make sure yours does!

1. Starch → Contained in Bread / potatoes / **A** → Used for Energy
2. Proteins → Contained in Meat / eggs / fish → Used for Building **B**
3. Fat → Contained in Butter / cooking oil / cream → Used for Energy
4. E.g. A B₁ B₂ C D E → Contained in Vegetables / fruit / cereal → Used for
5. E.g. Iron → Blood; Calcium → Teeth/ **D**; Sodium → Nerves; Iodine → Thyroid in the neck
6. **Roughage** (fibre) → Contained in Vegetables / fruit / cereal → Used for

6. → Contained in → Used for

Key: 1.1.carbohydrates 2. proteins 3. fats 4. vitamins 5.minerals 6. Water

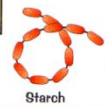
1.2.A cereals B cells C runs out D bones E system F chemical

HUMANS AS ORGANISMS

Nutrition

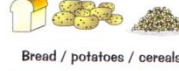
Nutrition is what you eat — and what you eat is really important for your health.
A balanced diet will have foods from all of the seven groups below — make sure yours does!

Carbohydrates



Starch

Contained in



Bread / potatoes / cereals

Used for



Energy

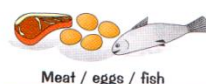
These are like fuel for your body. Active or growing folk need lots of carbohydrate.

Proteins



Proteins

Contained in



Meat / eggs / fish

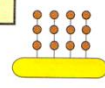
Used for



Building Cells

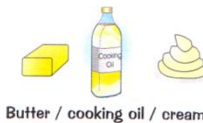
Proteins are vital for growth and to repair damaged areas.

Fats



Fat

Contained in



Butter / cooking oil / cream

Used for



Energy

Fats act as a store of energy — which you use if your body runs out of carbohydrates.

Vitamins

E.g. A B₁ B₂
C D E

Contained in



Vegetables / fruit / cereal

Used for

Vitamins are only needed in very small amounts — they keep many vital processes happening.

Minerals

E.g.

Iron

Calcium

Sodium

Iodine

Found in –



Blood



Teeth/Bones



Nerves



Thyroid in the neck

Needed for –

Roughage

(fibre)

Contained in



Vegetables / fruit / cereal

Used for

Roughage gives your digestive system an internal work-out keeping it fit, healthy and working.

Water

Contained in



Used for



About 75% of your body is water and all chemical reactions (e.g. digestion), take place in water – it's well important!

(Original page for teachers)

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Handout 2. Read and answer the questions.

„Living symphony of life”.

Chemical reactions within cells drive all activities associated with life. During chemical reactions, atoms of the reactants (starting materials) are rearranged to form the products (ending materials). In human cells chemical reactions make new products and release energy. At any moment, thousands of chemical reactions are going on in every cell of an organism's body – a living symphony of chemistry. Collectively, all of the chemical reactions occurring in an organism are called **metabolism**.

To start a chemical reaction we need energy and it is called **activation energy**. Most chemical reactions that happen in cells require very high temperatures in order to proceed fast enough to keep a cell alive. Such high temperatures kill most cells. Fortunately, the chemical reactions in cells take place very quickly and relatively low temperatures through the action of **enzymes**. Enzymes are proteins that can speed up a chemical reaction. They cause reactions to occur with less activation energy. Enzymes are biological catalysts. A **catalyst** makes a chemical reaction proceed faster, but it is not used up by the reaction.

A cell contains thousands of different kinds of enzymes, each promoting a different chemical reaction. Not all cells contain the same enzymes. The enzymes active at any one time in a cell determine what happens in that cell, just as traffic lights control the flow of the traffic in the city.

Each enzyme functions best within a certain temperature range. When temperatures become too low or too high, reaction rates decrease sharply. For instance, many enzymes in your body shut down when you have high fever. Another factor influencing enzyme activity is acidity (the strength of the acids in body fluids). When an organism's acidity is too high or low, most enzymes finish to function properly. One exception, however, is the enzyme pepsin, which functions in the stomach's highly acidic environment. Finally, the rate of an enzyme-catalyzed reaction is affected by the concentration of the enzyme necessary to catalyse that reaction. This is how your body controls its development.

Questions :

- 1.What is metabolism?
- 2.What is activation energy and how does it relate to cell metabolism?
- 3.Why do you think it is advantageous for the human body to have many different enzymes?
- 4.What factors affect the work of enzymes?

(Answers: 1._All chemical reactions taking place in an organism.2.Activation energy is the energy needed to start a chemical reaction.All the reactions that make up metabolism require activation energy.3.The many different reactions that occur in the body require many different enzymes.4.Temperature, acidity(except pepsin),concentration of enzymes.)



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***5.Additional activity/or home assignment.**(if time permits).

Insert the following words in the blank spaces.

Vegetarian; balance; nutrients; food types; diet; beans and nuts; growth; staple, legumes and nuts.

A healthy diet needs to provide all the energy and 1. ... that the body requires to stay healthy. It needs both variety and balance of 2. ... to provide everything that is needed. Foods are often grouped into several groups: 3. ... , vegetables, animal products, fruit, fats.

It is also important to keep the overall 4. ... of energy intake. A balanced diet will not be healthy if you are eating too much or too little to provide the energy you use for 5.

For example, many people choose to be 6. ... for personal or religious beliefs. They can replace animal products with vegetable products, such as 7. ... which provide the proteins and minerals that they get from the animal products. Any 8. ... as long as it provides all the necessary nutrients and energy and no more is a healthy one.

Key

1.nutrients 2.food types 3. Staples, legumes and nuts 4.balance 5.growth 6.vegetarian 7.beans and nuts 8.diet



