

CLIL for Geography and Biology

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Content

- How to implement CLIL in secondary schools
- CLIL in Biology
- CLIL in Geography



How to implement CLIL in secondary schools

- There are two secondary school types in Austria where CLIL is mandatory (HTL [72 hours of CLIL] and HLFS [36 hours of CLIL]).
- In all other secondary schools CLIL is optional.
- There are no guidelines on how to implement CLIL in other secondary schools.



How to implement CLIL in secondary schools

- Existing guidelines for HTL and HLFS
 - [HTL guidelines](#) (February 2013)
 - [HLFS guidelines](#) (November 2017)
- At the moment we are two teachers who are doing CLIL at our school.
- We did 36 CLIL hours of CLIL in each class, beginning with the first grade at the BAfEP Liezen.



How to implement CLIL in secondary schools

- [Mission Statement](#)
- [Documentation](#)
- Further CLIL training



CLIL at the BAfEP

„Um gesellschaftlichen und globalen Entwicklungen Rechnung zu tragen, ist die Verwendung der Fremdsprache als Arbeitssprache oder Integriertes Fremdsprachenlernen (Content and Language Integrated Learning – CLIL) anzustreben.“ (Lehrplan BAfEP 2016, S7)



CLIL at the BAfEP

„Wird von der Möglichkeit der schulautonomen Einführung des Integrierten Fremdsprachenlernens (Content and Language Integrated Learning – CLIL) Gebrauch gemacht, hat diesbezüglich die Festlegung der Pflichtgegenstände [...] und des Stundenausmaßes in den einzelnen Pflichtgegenständen und Jahrgängen durch schulautonome Lehrplanbestimmungen zu erfolgen.

Der Unterricht hat in Abstimmung mit dem Pflichtgegenstand „Englisch“ bzw. mit der schulautonom eingeführten lebenden Fremdsprache zu erfolgen. Unberührt bleibt die Möglichkeit der Anordnung der Verwendung einer lebenden Fremdsprache als Unterrichtssprache (Arbeitssprache) gemäß § 16 Abs. 3 Schulunterrichtsgesetzes.“ (Lehrplan BAfEP 2016, S5)



CLIL in Biology and Geography

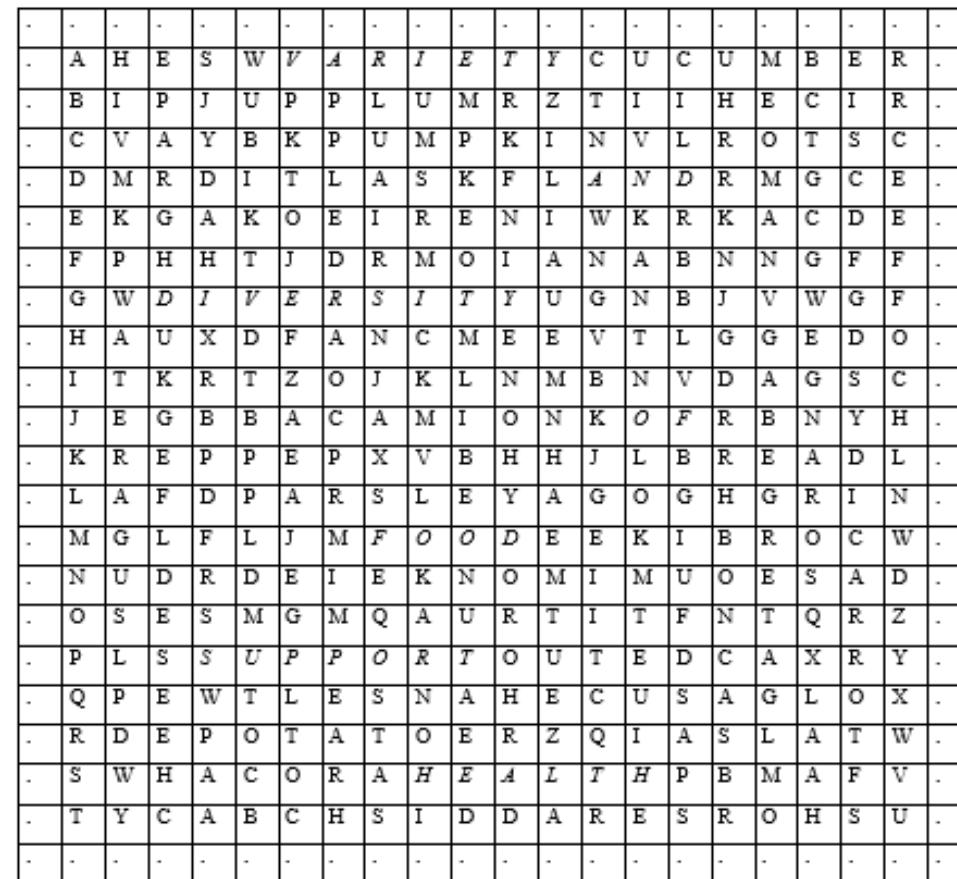
- [Onestopenglish](#)
- [Liveworksheets](#)
- [Sharemylesson Biology](#)
- [Teaching-Resources Geography](#)
- [Trashedworld](#)



NUTRITION

1.) Go together in pairs and find out the words about food hidden in this puzzle. Write them down, how many can you find?

FOOD SQUARE



2.) Complete the following message with the information of the puzzle.

VA..... A..... TY OF O..... DD..... EAT.....



BIOACTIVE SUBSTANCES

Put the lines of the following text in the correct order:

	cure different diseases. Examples are lycopene from tomatoes, allicin from garlic, lentinan
	do not only occur in plants but also in mushrooms. It has been known for ages that certain
	different bioactive substances.
	responsible for these effects are the bioactive substances. They are able to prevent or even to
1	These substances are often called phytochemicals but this is not correct because they
	nutritive plants, spices and mushrooms are of good effect on our health. The substances
	bioactive substances are prevention of cancer, stimulation of the immune system and
	their natural accompanying substances than purified substances at high concentrations.
	from shiitake etc.. Some of the effects scientifically proved to the results of use of certain
	bioactive substances often seem to achieve better effects when they are used together with
	reduction of the cholesterol level. In contrast to vitamins we can recognize these substances
	Experts advise to eat food as various as possible to provide our bodies with a great number of
	with the help of our sensory organs for their colours, tastes and smells. Like vitamins



BIOACTIVE SUBSTANCES

Teacher's key:

5	cure different diseases. Examples are lycopene from tomatoes, allicin from garlic, lentinan
2	do not only occur in plants but also in mushrooms. It has been known for ages that certain
13	different bioactive substances.
4	responsible for these effects are the bioactive substances. They are able to prevent or even to
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10	bioactive substances often seem to achieve better effects when they are used together with
8	reduction of the cholesterol level. In contrast to vitamins we can recognize these substances
12	Experts advise to eat food as various as possible to provide our bodies with a great number of
9	with the help of our sensory organs for their colours, tastes and smells. Like vitamins



FATS

There are some gaps in the text. Use the following words to complete the gaps:

cause, foods, fatty, more, are, twice, plants, cells, consume, energy:

A fat molecule is made of four molecular components. One of them is glycerol, the others are acids. Fats are insoluble in water. Like carbohydrates, fats can be used in cells to release energy. A gram of fat gives more than as much energy as is released by a gram of carbohydrate. The chemical reactions which have to take place to release the energy from fat are complicated. So tend to use carbohydrates first when energy is needed and they use fat only when all available carbohydrates have been used.

The large amount of which they contain makes fats very useful for storing energy. These stores are | needed in times of emergency. Fats are also needed to keep heat inside the body and for upholstering different body parts.

Fats are major components in butter, margarine, lard, bacon, nutritive oils etc.. Nuts, olives, avocados, seeds of many different (for example pumpkin, sunflower, poppy, rape, flax), sausage, milk, many sweets and many sorts of cheese contain a lot of fat.



In terms of health it is preferable to vegetable fats to animal fats. Fats found in animal (except for fish) contain mainly saturated fatty acids (these molecules contain as many atoms of hydrogen as possible) and they are accompanied by cholesterol. People who eat a lot of saturated fat and cholesterol are likely to get heart attacks and strokes than people who do not. This is because saturated fat and cholesterol and later on also calcium deposited inside of arteries, making them stiffer and narrower. Vegetable oils are mainly unsaturated fats (unsaturated fatty acids do not contain the maximum of hydrogen atoms) and do not contain cholesterol. So they do not heart disease etc.. Unsaturated fatty acids are essential. That means that our body is not able to produce them himself.



CARBOHYDRATES

The text contains nine jumbled words. They do not mean anything. Find and correct them.

Carbohydrates are divided into mono-, di- and polysaccharides.

Glucose and fructose are monosaccharides, that snaem that they are the smallest carbohydrate molecules. Disaccharides are molecules osedcomp of two monosaccharides, sucrose and maltose belong to them. Mono- and disaccharides are water-soluble and taste sweet. Polysaccharides are large molecules, they consist of nyma monosaccharides joined together. Examples are starch and glycogen. Most polysaccharides are not water - soluble and they do not steta sweet.

Carbohydrates are chiefly used for releasing energy (this is done by respiration) and setimesom for storing energy (glycogen). Carbohydrates should amount to more than 50% of the daily supply of energy. Polysaccharides are |
broken down wolsly in our digestive tracts, so
they provide us consistently with energy for a long
time. Mono- and disaccharides are digested
hitiw a short time, they provide us quickly with
energy, so they are osno used up and the feeling
of hunger come back at the next moment.

Cereals (wheat, oats, barley, rye, rice, maize, millet etc.) and cereal products (flour, bred, cakes, noodles etc.), pseudo-cereals like buckwheat and quinoa, tatooeps, milk fruits, chestnuts and sweets contain many carbohydrates.



PROTEINS

Protein molecules consist of long chains of smaller molecules joined end to end. These smaller molecules are called amino acids. There are 20 different amino acids. Any of these 20 can be linked together with any other to make a protein molecule. A protein molecule may consist of thousands of amino acids. Each protein molecule is made of amino acids in a precise order. Even a small difference in the order of amino acids makes a different protein. The chains of amino acids form different three-dimensional structures.

There are essential (we cannot produce them) and non-essential (we are able to produce them from other chemicals) amino acids. The requirement of essential amino acids can be easily covered by eating proteins from animals. It is more difficult but not impossible to cover this requirement with vegetarian food.

Meat and fish, milk, many dairy products and eggs, pulses (beans, peas, lentils, soybeans) and wholemeal products as well as some wild herbs contain much protein.



Use the code to find out more information (for example: (3/5) (1/1) (1/4) = gap):

	1	2	3	4	5	6
1	a	c	m	p	e	<u>j</u>
2	y	w	b	r	s	z
3	t	d	h	o	g	n

Much of the proteins in the food we eat is used as building material. Proteins are needed for

(3/5)(2/4)(3/4)(2/2)(1/6)(3/6)(3/5)

and for

(2/4)(1/5)(1/4)(1/1)(1/6)(2/4)(1/6)(3/6)(3/5)

damaged parts of the body. Cytoplasm and cell membranes as well as intercellular substance contain a lot of protein. Proteins are also needed to produce

, (1/1)(3/6)(3/1)(1/6)(2/3)(3/4)(3/2)(1/6)(1/5)(2/5)

(1/5)(3/6)(2/6)(2/1)(1/3)(1/5)(2/5) and some

(3/3)(3/4)(2/4)(1/3)(3/4)(3/6)(1/5)(2/5).

Besides they can be used to provide energy.



FIBRE

The following text contains eleven extra words which do not belong to the sentences. Find and highlight them and put them together to form a complete, biologically meaningful sentence.]



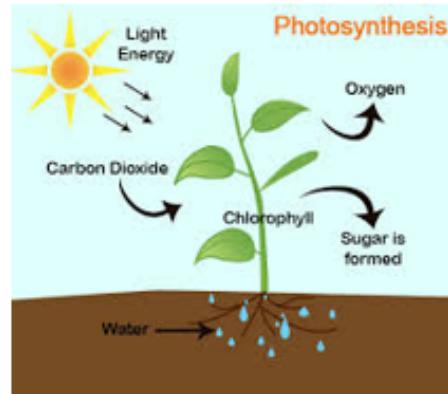
Fibre, or protect roughage, is a part bacteria of food which cannot be digested. It does not leave the digestive tract to be transported by blood to us different places in the body. It is only ingested, passes through the digestive system from diseases the beginning to of the end and then is egested. Fibre helps the alimentary tract working properly. Food moves through these organs because their muscles contract and relax to squeeze it along. The muscles are stimulated to do this when there vitamins is food in the alimentary tube. The muscles work the more the harder or less digestible food is. A part of fibre swells up with water and and increases its volume. So fibre stimulates the activity these of the alimentary canal and prevents constipation. Fibre also produce is important for the gut flora. Fibre helps to reach a lasting sense of satiation quickly germs and it supports excretion of harmful substances (cholesterol for example).

Chiefly plant against food (vegetables, fruits, wholemeal products), mushrooms but also arthropods contain much fibre. Fibre-substances are cellulose, lignin, chitin etc..



Photosynthesis

Green plants and some bacteria are the only organisms, which can perform photosynthesis. That means, that they are able to produce glucose ($C_6H_{12}O_6$), an organic substance containing much energy, and oxygen (O_2) deriving from the inorganic substances water (H_2O) and carbondioxide (CO_2). Therefore they need chlorophyll, a green-coloured catalyst, and sunlight, which is a form of energy. Producing organic food out of inorganic substances is called autothrophy.



"Dieses Foto" von Unbekannter Autor ist lizenziert gemäß CC BY-SA

The balanced chemical equation for this process is: $6 CO_2 + 6 H_2O \xrightarrow[\text{chlorophyll}]{\text{light}} C_6H_{12}O_6 + 6 O_2$

Glucose is soluble in water and therefore plants change it into starch, which is more or less insoluble in water. Otherwise plant cells would burst because of absorbing too much water. Deriving from glucose plants produce other organic substances like proteins, fats and vitamins by the aid of different other substances (minerals etc.).

Humans, animals, mushrooms and most bacteria cannot photosynthesize. So they depend on organic stuff coming from green plants and some special bacteria. Using these substances they can produce other organic stuff. This way of living is called heterotrophy.

Not all species of plants are green. Some parasitic plants like certain orchids depend on photosynthesis products of their host plants.

All oxygen in the Earth's atmosphere (in form of O_2 and O_3) has been produced by photosynthesis. Originally the atmosphere was free from elementary oxygen. Only after certain bacteria had developed the ability of photosynthesizing and the subsequent accumulation of oxygen in the atmosphere this originally useless waste material became more and more important and organisms developed the ability to breathe.



enzymes

The balanced chemical equation for respiration is: $C_6H_{12}O_6 + 6 O_2 \rightarrow 6 CO_2 + 6 H_2O + \text{energy}$

Photosynthesis is of great importance for humans:

- oxygen for breathing
- ozone in the atmosphere absorbing a part of ultraviolet radiation
- food
- biomass
- paper
- synthetic materials (plastic)
- textile fibres
- heating material
- building material
- fossil sources of energy

Photosynthesis takes place in the chloroplasts of plant cells, respiration in the mitochondria. Not only humans and animals but also photosynthesizing organisms have to respire. Photosynthesizers produce much more oxygen than they need themselves.

Answer the following questions using complete sentences!

- During which chemical process light energy is stored within sugar?
- Which organisms are able to photosynthesize?
- Within which organelles of plant cells happens photosynthesis?
- Name at least 2 textile fibres, which are produced by green plants!
- Explain the balanced chemical equation of photosynthesis!
- How is photosynthesis connected with meat?
- What is to understand by "fossil sources of energy"?



MOSQUITOES

Mosquitoes are parasitic insects. Like butterflies they belong to the group of insects which undergoes a complete metamorphosis. That means that their comprises four very stages: the egg, the larva, the pupa and the adult insect. Only adult female mosquitoes are bloodsuckers. They attack humans and animals because they need blood for the formation of eggs. When they the host's skin by use of their fine mouth parts they inject saliva into the small wound. This fluid contains a locally effective narcotic and ingredients that the coagulation of blood. Thus, in most cases, the hosts don't feel the bites of the insects at once and the mouth parts do not Adult males feed on another nutrition such as the nectar of flowers. The development of young stages (eggs, larvae, pupae) takes place in standing waters. Larvae eat algae, pollen, bacteria crumbled organic materials.

Some species of mosquitoes are not only annoying and a big nuisance, they also are able to transmit dangerous diseases like or yellow fever.

It is possible to protect oneself against these insects by using repellents and pesticides, mosquito nets and covering the hole body. Some insect pathogens (for example certain bacteria) and many insectivorous animals (spiders, fish, frogs, birds, bats, ...) are natural antagonists of In contrast to pesticides they do not endanger the health of humans and other organisms and therefore should be supported in insect control. Destruction of all biotopes inhabited by youth stages would the numbers of mosquitoes but it is not desirable because it also damages many other species.



Correct the text and fill the gaps using the following words in a way that the sentences make sense: malaria, prevent, reduce, and, penetrate, life cycle, stick together, clothes, different, mosquitoes



MOSQUITOES

Mosquitoes are parasitic insects. Like butterflies they *gonleb* to the group of insects which undergoes a complete metamorphosis. That means that their life cycle comprises four very different stages: the *gég*, the larva, the *pupa* and the adult insect. Only adult female mosquitoes are bloodsuckers. They attack humans and animals because they need blood for the formation of eggs. When they penetrate the host's skin by use of their fine mouth parts they inject saliva into the small wound. This *uifld* contains a locally effective narcotic and ingredients that prevent the coagulation of blood. Thus, in most cases, the hosts don't feel the bites of the insects at once and the *muhop trsat* do not stick together. Adult males feed on another nutrition such as the nectar of flowers. The development of young stages (eggs, larvae, pupae) takes place in standing waters. Larvae eat algae, pollen, *bertacia* and crumbled organic materials.

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biotopes inhabited by youth *gastes* would reduce the numbers of mosquitoes but it is not desirable because it also damages many other species.



Some words in the following text do not mean anything. Find and correct the jumbled words.

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FUNGI



Correct the text and fill the gaps using the following words in a way that the sentences make sense:

**release, fungus, vitamins, them, hyphae, ecological,
different, exist, limit, into**

Living beings are grouped into at least four categories called kingdoms. One of them are the fungi. The others are animals, plants and bacteria.

More than 100 000 different species of fungi have been identified by mycologists up to now. Some of them are unicellular (for example yeasts), most of are multicellular like molds, chanterelles, puffballs, boletes, stink horns and ink caps.

The whole organism of a multicellular fungus consists of very fine threads composed of cells following one after the other. They are called hyphae and divide many branches. The network of forms a mycelium. Mycelia permeate their substrates and if two adjacent hyphae of different mating types (hyphae coming from different spores but of the same species) fuse together a fruiting body of the will develop. The fruiting body releases many spores for reproduction. Spores falling down onto suitable food sources are able to germinate and produce new hyphae.

Fungi digest their food outside their bodies: they enzymes into the surrounding environment, breaking down organic matter into a form the fungi can absorb.

Many fungi are saprophytic. They feed on dead organic matter (for example wood, fallen leaves, bread, faeces, carcass) and in this way make nutrients available for other living organisms. But not all fungi themselves to the breakdown of decaying organic matter. Some fungi live in symbiosis with other living things (e.g. truffles and oak trees). Others are parasites in or on plants (e.g. mildew on leaves), animals and humans (e.g. some skin diseases like athlete's foot) or other fungi (e.g. parasitic bolete on puffballs) and there even a few fungi living as predators and trapping small animals.

Apart from their importance fungi are of additional great value for mankind. Some of them are needed to produce cheese and other food, some are needed for production of antibiotics and other medicine, some are useful in pest control and the fruiting bodies (mushrooms) of many fungal species are edible and full of , bioactive substances and minerals.



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Apart from their ecological importance fungi are of additional great value for mankind. Some of them are needed to produce cheese and other food, some are needed for production of antibiotics and other medicine, some are useful in pest control and the fruiting bodies (mushrooms) of many fungal species are edible and full of vitamins, bioactive substances and minerals.

Find out which sentences are true or false and which word is formed by the letters.

	true	false
1.) Yeasts are unicellular fungi.	M	L
2.) All fungi are parasites.	L	U
3.) Many species of fungi have edible parts.	S	A
4.) Hyphae form Mycelia.	H	B
5.) Molds never can be found on bread.	F	R
6.) Fungi reproduce by spores.	O	F
7.) Fungi cannot cause diseases.	U	O
8.) Fungi make nutrients available for other organisms.	M	P

The correct word is



CLIL in Geography for distance learning or hybrid settings

- **Topic:** The European Union
- **Activity Type/Method:**
 - Jigsaw-reading (understanding & remembering)
 - Reading a text and taking notes
 - Mind mapping (understanding, analyzing)
 - Comparing and discussing the findings (understanding, analyzing)
- **Time:** 2x50 min
- **Ressources:**
 - Mentimeter survey
<https://www.menti.com/unhf5h8yjb>
 - brochure – EU & me
<https://op.europa.eu/en/publication-detail/-/publication/56fe2150-a83c-11e9-9d01-01aa75ed71a1>



CLIL in Geography for distance learning or hybride setting

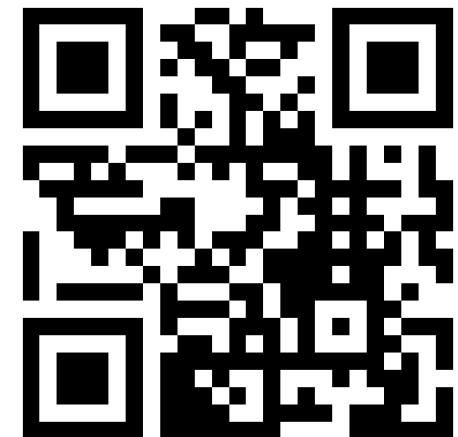
- Content-Related Learning Outcome:
 - Students know what the European Union is
 - Students know how does the European Union work
 - Students know why the European Union is relevant to our daily life
 - Students know what is on the Agenda of the European Union
- Language-Related Learning Outcome:
 - Students know basic words and terms connected to the topic European Union
 - Students can extract information from a text and can create a mindmap
 - Students can talk about various aspects of the European Union



The European Union

- Go to the Mentimeter survey and name three aspects you associate with the European Union.

<https://www.menti.com/unhf5h8yjb>



The European Union

- You will read one of the four chapters of the brochure “[EU & me](#)“ which the teacher has uploaded onto MS Teams. Your teacher will put you into four groups [*info for the teachers: you can use a [random generator](#).*] This will then tell you which text you need to work on. Do all the exercises of your text. Underline all words you are not familiar with. When you have finished reading the text, look up any unfamiliar words with an online dictionary and inscribe them in the [EU wordlist](#)
- With a partner who has read the same text, you will then discuss the most important facts of your text via the video conference function of MS teams.
- Then go to [Mind-map-online.de/](#) and create a mindmap summarizing the most important information of your text.



The European Union

- Get together in groups of four (one group member of every chapter) – *[info for the teachers: use the random generator if necessary]* – and discuss the main aspects of each chapter via MS teams.
- Everybody has to create a [flinga board](#) with the main information of all four chapters.



CLIL in Geography – Good practice

- [Green Hot Beverage](#)
- [The Green Company](#)
- [Makebafepgreen](#)
- [Make the school a little bit greener](#)



Sources

- Lehrplan der Bildungsanstalt für Elementarpädagogik. https://bafep10.at/wp-content/uploads/2016/03/VO-Lehrplan-neu-Juli-2016_Deckblatt.pdf (01.11.2020).
- Content and Language Integrated Learning. Leitfaden zur Umsetzung an HTLs. http://lickl.net/datg_fses/Leitfaden_zur_Umsetzung.pdf (01.11.2020).
- Content and Language Integrated Learning. Handreichung zur Umsetzung von CLIL an Höheren land- und forstwirtschaftlichen Schulen. https://www.hum.at/images/unterrichtsentwicklung/CLIL/Leitfaden_HLFS_06112017_Version2.pdf (01.11.2020).

