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| **Project ID: 2021-1-CZ01-KA220-SCH-000034484**    **COURSE FOR ENVIRONMENTAL EDUCATION**  *e-Modules: Teaching Learning activities and their technology enhanced material set to develop*  ***DISCLAIMER***  Obsah obrázku symbol, Písmo, logo, Grafika  Popis byl vytvořen automaticky*Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.*  **COURSE AUTHORS**   |  |  | | --- | --- | |  | Lubomír Hájek, Petra Garay |   **COURSE SHARING LICENSE**   |  |  | | --- | --- | | Une image contenant symbole, cercle, capture d’écran, Graphique  Description générée automatiquement | You are free to:   * Share — copy and redistribute the material in any medium or format for any purpose, even commercially. * Adapt — remix, transform, and build upon the material for any purpose, even commercially. | |
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| **MODULE 2** | **CYCLICAL NATURE** |
| **PART 5** | **Ultimate source of energy and the form of energy while leaving the**  **ecosystem** |
| **Lesson 2** | **Living organisms and green energy** |

**SUMMARY**

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# 1. COURSE TIME, TARGET AND TOPIC

**Age of target students:** 15+

**Teaching time:** 1 hour

**Disciplines:** Biology, Geography, Human sciences

**Title:** Living organisms and green energy

# 2. COURSE OBJECTIVES

## Competences promoted in this lesson:

* Communication in foreign languages competency
* Digital competency
* Initiative and entrepreneurship competencies
* Social and citizenship- related competence
* Cultural awareness

## Lesson objectives:

* The students deepen their knowledge regarding the green energy and the advantages to human well-being.
* The students learn to understand the circadian rhythm.
* They apply the knowledge to practical activities.

# 3. LEARNING – TEACHING PROCESSES

There are 4 activities in this lesson:

1. **ENGAGE:** learn about the effects of the sun
2. **EXPLORE:** the effects on living organisms
3. **EXPLAIN:** the term of light pollution
4. **EXTEND:** your knowledge on melanin

# 4. EVALUATION

Quiz, kahoot

# 5. DOCUMENTS

### ENGAGE

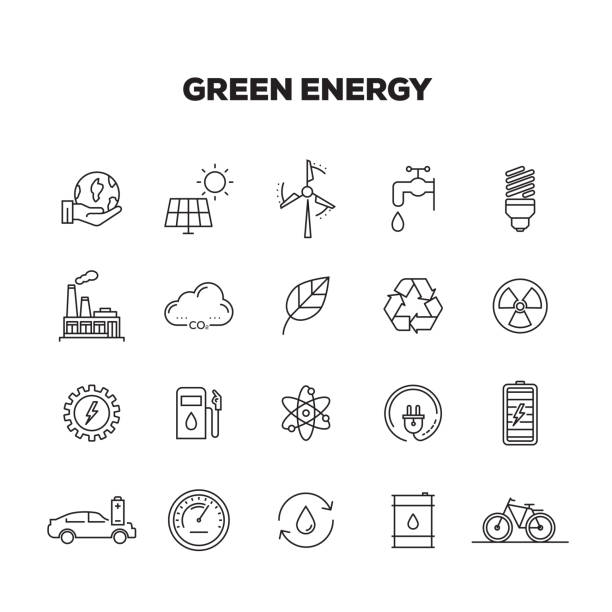
### *Body clock*

1. ***WATCH*** *the videos and answer the questions.*

[*https://youtu.be/Mi8wDJipgS0*](https://youtu.be/Mi8wDJipgS0) *(2.23 min)*

[*https://youtu.be/UbQ0RxQu2gM*](https://youtu.be/UbQ0RxQu2gM)

1. What kind of vitamin does our skin produce because of the sun?
2. Have you ever heard about the circadian rhythm?
3. Can the circadian rhythm cause some diseases of civilization?
4. In your opinion, how could following a circadian rhythm help solve some of ecological problems?
5. Think about all sources of energy and discuss the access to them (*use* *picture 1*).



### EXPLORE

**Explore the effects on living organisms:**

1. **Blue light** is a short wavelength, which means it produces higher amounts of energy. Unlike other forms of light, the eyes cannot effectively filter blue light, so more can pass through the eye to the retina. Blue light produces both benefits and concerns for our eyes and overall health.
2. **Obsah obrázku text, elektronika

   Popis byl vytvořen automaticky**​​**Circadian rhythms** are physical, mental, and behavioural changes that follow a 24-hour cycle. These natural processes respond primarily to light and dark and affect most living things, including animals, plants, and microbes.
3. **Diseases of civilization** large amounts of scientific evidence positively correlate Western diet to acne, obesity, diabetes, heart disease and cancer.
4. **Melanin** provides pigmentation to your skin, eyes, and hair. The substance also absorbs harmful UV (ultraviolet) rays and protects your cells from [sun damage](https://my.clevelandclinic.org/health/articles/5240-sun-damage-protecting-yourself).
5. **Solar energy** is any type of energy generated by the sun. Solar energy is created by nuclear fusion that takes place in the sun. Fusion occurs when protons of hydrogen atoms violently collide in the sun’s core and fuse to create a helium atom.

**TASK:** Try on your own 1 day following circadian rhythm, make notes about positives and negatives of your normal day and a day following CR.

**Obsah obrázku diagram

Popis byl vytvořen automaticky**

### 

### EXPLAIN

**The ultimate source of energy (SUN):**

* Sun is an unlimited and renewable supply of energy and our primary source of energy.
* The sun’s energy is essential for numerous activities, including photosynthesis, the water cycle, nuclear power, cloud formation, the creation of fossil fuels, and so on.
* It gives organisms the light they need for growth, everyday routines, daily regularity etc.

**Light pollution:**

* Is a pollution of artificial lightning in urban areas at nighttime causing many health and environmental issues.

Obsah obrázku Webové stránky

Popis byl vytvořen automaticky

* Light pollution radiates blue light spectrum higher than it should be in the night and creates skyglow (diffuse brightness of the night sky).
* **Obsah obrázku příroda, noční obloha

  Popis byl vytvořen automaticky**This negatively affects the circadian rhythm or melatonin excretion of plants and vertebrates. Causing illnesses, extinction of insect, changes in natural reproduction of animals and life manifestations of plants.

**TASK:** Summarize the effects of the light pollution.

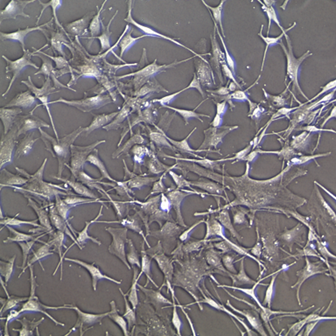
### EXTEND

Melatonin is a hormone that your brain produces in response to darkness. It helps with the timing of your circadian rhythms (24hour internal clock) and with sleep. Being exposed to light at night can block melatonin production.

Melanin

The pigment that gives human skin, hair, and eyes their colour. Dark-skinned people have more melanin in their skin than light-skinned people have. Melanin is produced by cells called melanocytes. It provides some protection again skin damage from the sun, and the melanocytes increase their production of melanin in response to sun exposure.

Obsah obrázku text, snímek obrazovky, harfa, umění

Popis byl vytvořen automaticky 

**TASK:** How much melanin do you have? Discuss with your friends about your hair, eyes, and skin colour. How easy is it for you to get sunburnt?

### EVALUATE

1. **Answer the questions in the following quiz:**

<https://myem9jxobda.typeform.com/to/nrG39kH6>

**2.Play the kahoot:**

<https://create.kahoot.it/share/living-organism-and-green-energy/c5017f14-3333-4672-b139-bec4d4432394?fbclid=IwAR0oho7jdl-RW4NgnhYPZJ1_tTrOIwiIUSu80Ndcf_HLWIoXQsGqfL0NESQ>

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