

MODULE 2

Lesson part ACD Austrian team:

Circadian Rhythm, sleep-awake cycle as an example of the cyclical nature by humans

Keyterms: *cyclical nature, circadian rhythm, sleep-awake cycle, dreams, sleep-awake diary, light-effects, arts&scienc,*

Objectives:

1. *Students will understand the circadian rhythm as a form of the cyclical nature and its influence on human health and wellbeing including the gender perspective;*
2. *Students will investigate their sleep-awake cycle through art-based tools;*
3. *Students & teachers will engage in optimization of Health-related policy implementation in their schools and local communities, optionally connect with the international youth networks*
4. *Students will widen their knowledge in science & policy through diversity-sensitive, inclusive and multilingual art-based methods*

About

In this lesson, learners will explore circadian rhythm as an example of the cyclical nature and its connection to humans. They will examine how circadian rhythms have an impact on their wellbeing while reflecting on their sleep-awake cycle by use of the sleep-awake-diary, and reflect on their sleep-awake science through art-based methods. Additionally, the brief introduction to health-related policy papers and platforms that empower high school students to engage in the field of health and wellbeing, will provide them with the opportunity to contribute with their ideas and concerns for positive change.

The lesson can be timely extended as a bound of week-long projects for further research.

Methodology

Art-based multimedia inquiry enables a multiple access to the topic with a brief scientific insight on sleep-awake cycle and supports the metacognitive approach (Perkins 1992)¹ to learning, that involves the use of four key strategies, at four levels: summarizing through tacit experiences, questioning through sensorial awareness, clarifying through reflective engagement, and predicting through strategic *design thinking*² process of learning in which students progress through the stages of Discovery, Ideation, Experimentation, and Evolution in search of innovative solutions to emerging challenges and the ideas for the improvement.

Guiding insights and findings from this lesson are extended in the MODULE 3 with introductory to somatic methodology for resilience, including the practical part with dance arts-based tools for individual and group practices, also integrated in the curriculum. STEAM-inclusive approach includes arts in science, technology engineering and mathematics with insights adapted for blind and visually impaired students.

By combining science education with creative approaches, we aim to foster greater awareness on physical and mental well-being and activate creativity among learners.

¹ Sources: <https://www.cambridgeinternational.org/Images/272307-metacognition.pdf> , Jessica Hoffmann Davis: **Metacognition and Multiplicity: The Arts as Models and Agents.** Educational Psychology Review [Vol. 12, No. 3 \(2000\)](#), pp. 339-359 (21 pages) Published By: Springer and <https://bep.education/wp-content/uploads/2020/05/FourLevels.pdf>

² Sources: <https://tll.gse.harvard.edu/design-thinking> , <https://blog.technokids.com/teaching-strategies/design-thinking-education/> , <https://elearning.tki.org.nz/Teaching/Future-focused-learning/Design-thinking>

Introductory guide:

Sleep has a significant impact on mental health, physical health, and daily life performance and agility.³

The questionnaire guide for the creation of a sleep-awake diary has been designed as a tool for individual reflection to sleep rituals, patterns, and routines, reflect on the sleep environment, and sleep barriers and to protocol the findings which can be exchanged and evaluated for the further, more in-depth research.

Arts-informed science education is a holistic process that enables generative knowledge process, based on assumptions that reflect the multidimensional, intersubjective, and eco-social-contextual nature of human experiences.

Art Integrated Learning (AIL)⁴ is a teaching-learning model based on learning 'through the arts' and 'with the arts' in the process where art becomes the medium of teaching-learning and, a key to understanding concepts within any learning subject.

Art-based methodology included in this lesson ranges from fine arts which includes visual arts (paintings, photography), audio (music, podcast), to multimedia (art installation) digital art-media, interviews, questionnaires, inTalks, on-off (zoom, in-person) performative (dance, role play) to AI arts such as Wombo

Science-Policy interface:

- Introducing the topic-relevant policy papers and contextualizing the learning insights into politically governed rules, students will enhance their skills and capacities to engage in the science-policy interface related to environmental governance towards ecological transition. Furthermore, they will explore how science-policy interfaces work in practice through art-based activities and gain opportunity to connect with youth platforms engaged in science-policy communication and its implementation, improvement, and dialogue with youth.

The lesson is divided into three parts as following:

1. In the first, introductory part of this lesson consists of guiding insights, recommended web articles, videos, and podcasts on Circadian Rhythm as an example of the cyclical nature, with the tasks for hands-on experiences and engagement through reflective, imaginative and multisensorial experiences in a multilingual setting. The insights are deriving from the sources found by the Sleep foundation, European Space Agency (ESA), Economist and TED talks, with additional insights on the circadian rhythm of the blind provided by blind high school students from Austria and recorded. In this introductory lesson to the unit, students conduct an in-class survey (See the annex: Sleep-awake cycle survey) to learn about the circadian rhythms and biological clocks of their peers. Using this survey, students identify the stressors & sooters in their virtual and in-person classroom.

³ Source: *European Journal of Public Health*, Volume 31, Issue Supplement_3, October 2021, ckab164.018, <https://doi.org/10.1093/eurpub/ckab164.018>

⁴ Sources: <https://blog.teachmint.com/what-is-art-integrated-learning/>, <https://www.kennedy-center.org/education/resources-for-educators/classroom-resources/articles-and-how-to/articles/collections/arts-integration-resources/what-is-arts-integration/>

2. The second part of this lesson enables deeper dive into the topic of the sleep-awake-cycle and the stages of sleep with scientific insights, followed by introduction to the lunar- cycle and its effects on humans from the gender perspective. This part also invites students to reflect on, describe and exchange their experiences, and create artworks inspired by light sources, which can be finally composed in a collective format and presented in a virtual-as well as in on-site exhibition.

In this part, we are reflecting on dreams in two modalities: 1. Dreams during the sleep and 2. on daydreaming modalities.

Guiding insights are deriving from fine arts, accompanied with digital art-tools for hands-on experiences.

3. In the third part of the lesson, the topic of health&wellbeing is situated into policy. The brief introduction to the Global Health Policy (GHP), European policy paper and the European Youth4Health platform dedicated to health and wellbeing in the area of public health together with the excerpts from the World Health Organisation (WHO) report from 2019 on arts&health will serve as a main source for a week-long project that can be examined as a final act of this lesson and the lesson in MODULE 3 in which the topic of health&wellbeing is extended with insights on Resilience and responsible consumption of natural resources by examples of the thermal & kinesthetic energy use with dance-arts based methods and practices.

Ideas for the creation of a well-sketch-booklet with creative methods and digital tools for individual and collective regenerative practices during the micro-breaks at school on-site and virtual (“digital wellness”) are summarized in the last part of this lesson as an optional activity for students and teachers.

By engaging with policy papers and platforms, we can become active agents of change, contributing to the improvement of health and wellbeing for ourselves and future generations. Let us embrace the power of the arts, scientific knowledge, and policy engagement as we embark on this transformative learning journey together!

Questions to circadian rhythm – sleep-awake cycle, dreams, and resilience:

1st part: circadian rhythm, sleep-awake cycle

1. What makes you feel tired during the day?
2. how you recognize “being tired” on what symptoms of your body?
3. And, what you do when feeling tired?
4. How is your sleep rhythm-do you have any experiences of sleeping disorder?
 - 4.1 If so, what do you do to improve your sleeping rhythm? Please share your experiences in 3-5 sentences:
5. What makes you energized, awake and what makes you relaxed?

- activities:
food:
experiences (such as dance):

6. What makes you stressed?

How you manage it to come down from stress and prevent such conditions?

Please share some of your experiences and good practices, by using the key terms:

2nd part: Dreams

Dreams are stories, emotions and images that usually occur involuntarily in our minds create while we sleep. They can be fun, entertaining, but also frightening.

A nightmare for example is an unpleasant dream that can cause a strong negative emotional response from the mind, such as fear, despair, anxiety, while a daydream as a visionary fantasy, is experienced while awake, when attention drifts to a more personal and internal direction.

A behavior disorder that originates during deep sleep, known as the sleepwalking or a "somnambulism", results in walking or performing other complex behaviors while still asleep.

Watch/listen further videos:

Why Do We Dream? What Exactly Are Dreams? World of Science

<https://www.youtube.com/watch?v=knU5iVY8P8k>

Dreams- science documentary:

https://www.youtube.com/watch?v=0mKJm_Dstgk

How do blind dream video:

<https://www.youtube.com/watch?v=uLKZ59OScQM>

Nightmare

A nightmare is an unpleasant dream that can cause a strong negative emotional response from the mind, such as fear, despair, anxiety.

Sleep walking

Sleepwalking, known as somnambulism, is a behavior disorder that originates during deep sleep and results in walking or performing other complex behaviors while still mostly asleep. It is more common in children than adults and is more likely to occur if a person has a family history of the condition, is sleep deprived, or is prone to repeated nighttime awakenings.

Daydreaming

A daydream is a visionary fantasy, experienced while awake, when attention drifts to a more personal and internal direction.

The Secret Life of Walter Mitty | Overcoming Maladaptive Daydreaming

<https://www.youtube.com/watch?v=Kj5XR32zs7E>

Movie: Secret Life of Walter Mitty Song: Space Oddity (David Bowie + Kristen Wiig)

<https://www.youtube.com/watch?v=HEwtPwkeXjw&t=6s>

Reflect on your dream state by answering the following questions with yes, no, example:

1. Are you dreaming during the night?
2. Do you remember your dreams?
3. Does/and if so, how dreams affect your emotional state?
4. Share a title, a key term or situation from one of your dreams:

5. Have you experienced daydreaming, nightmare, sleepwalking?

Creative approach to your dream state:

Draw or paint motives from your dream, compose a song, create dance, write a poem or a story based on your dream, whatever technique you can use to memorize and share your dream experience

Dreams

Daydreaming:

Web article “Why daydreaming is good for you” by Time magazine:

<https://time.com/6256541/why-daydreaming-is-good-for-you/>

Positive and negative effects of daydreaming by Everyday health webpage article:

<https://www.everydayhealth.com/emotional-health/positive-negative-effects-daydreaming/>

Nightmares: <https://www.sleepfoundation.org/nightmares>

Sleep walking: <https://www.sleepfoundation.org/parasomnias/sleepwalking>

Web article “What do blind people dream” by sleepfoundation:

<https://www.sleepfoundation.org/dreams/can-blind-people-dream#:~:text=A%20dreaming%20blind%20person%20experiences,View%20Source%20and%20more%20nightmares>

Science article, maladaptive daydreaming:

<https://www.sciencedirect.com/topics/psychology/maladaptive-daydreaming>

3. part: sleep-wake cycle influence on resilience

How you build your resilience?

Let us reflect on your rest&sleep habits while answering the following questions:

1. Are you able to take time for short breaks during the day?
2. How you recognize the need to take a short break?
3. What do you need for a short break?

Sleep habits and the environment

Did you sleep well?

The scientific study of sleep is called Somnologie. The subset of the Somnologie is the Sleep medicine, a study on disorders and irregularities of sleep.

How you sleep best way, what is the most important for you to sleep well?

Reflect on your sleep-environment, while describing the following:

1. Pillow (feathers, micro phaser, cotton, ...):
2. Bed (large size, small size):
3. Temperature (your preferences: warm or cold in the room where you sleep)?

4. Mattress: soft, or hard?
5. Light (preferring a lamp or total dark room)?
6. What do you like to do before asleep? Share some examples on what is good for you, to get asleep easy, such as listening music, reading, ... What kind of music or readings is relaxing?

Share your further ideas and your experiences to improve resilience through good sleep

Take a quiz on mattress, reflect on your findings, if any novel ideas

Mattress quiz: <https://www.sleepfoundation.org/mattress-quiz>

Additional insights on gender-specific aspects of the Lunar-effect

Did you know that the moon also plays a crucial role in the cyclical rhythms of nature? The moon inspires artists and poets but has also a tangible effect on our physical and emotional states.

Understanding the cyclical nature of the moon can also help us optimize our daily routines for better sleep, increased productivity, and a more resilient mindset.

Task: Listen to Ludwig van Beethoven's Moonlight Sonata, which captures the peaceful and introspective mood of a moonlit night. How you experience this composition, what effects it have on your mood, emotional state (sleepy or wake, dreamy, ...)?

The “lunar effect” is based on the belief that health and behavior are altered during specific stages of the lunar cycle.

According to science, the lunar phases gradually change over a [synodic](#) month (c. 29.53 days) as the orbital positions of the Moon around Earth, and Earth around the Sun, shift.

The lunar cycle has been known to affect the menstrual cycle of women due to the synchronization of the two cycles. This is because the moon's gravitational pull affects the tides and the water in our bodies, including the fluids in the reproductive system. Research has shown that during the full moon and new moon phases, women may experience changes in their menstrual cycle, including more intense cramps and heavier bleeding.

Moreover, the lunar cycle has also been linked to changes in mood and energy levels. Studies have shown that women may experience more intense emotions during the full moon phase, including heightened anxiety, depression, and irritability. On the other hand, some women may feel more energetic and creative during the new moon phase.

As for male, research has shown that they may also experience changes in mood and behavior during the full moon phase. Studies have found a correlation between full moon cycles and an increase in hospital admissions for behavioral issues, including aggression and violence. (Komada Y, Sato M, Ikeda Y, Kami A, Masuda C, Shibata S, 2021)

Source: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8003924/> Komada Y, Sato M, Ikeda Y, Kami A, Masuda C, Shibata S. The Relationship between the Lunar Phase, Menstrual Cycle Onset and Subjective Sleep Quality among Women of Reproductive Age. *Int J Environ Res Public Health*. 2021 Mar 21;18(6):3245. doi: 10.3390/ijerph18063245. PMID: 33801068; PMCID: PMC8003924.

References for further readings:

https://www.sleepfoundation.org/wp-content/uploads/2023/01/7-Night-Sleep-Habit-Builder-Guidebook.pdf?utm_source=Klaviyo&utm_medium=email&utm_campaign=Introduction&utm_id=RatwLk&utm_kpi=01H0MPD39Z9F37EG1N0DRTJ98M&_kx=_FvZHLxCujV1SCd46obnzNY-iZK4IUjppqiUC5JH3PgV2FSGC34T11qqbSxds8PS.TKJEB5

Web article: Effects of light on human circadian rhythms, sleep and mood
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6751071/>

Mattress quiz: <https://www.sleepfoundation.org/mattress-quiz>

- NASA: Moon: https://www.nasa.gov/mission_pages/moon/main/index.html
- NASA: The Moon and Human Health: <https://www.nasa.gov/feature/the-moon-and-human-health>
- NASA: Lunar Reconnaissance Orbiter: https://www.nasa.gov/mission_pages/LRO/main/index.html
- ESA: Lunar Resources: https://www.esa.int/Science_Exploration/Human_and_Robotic_Exploration/Lunar_resources
- ESA: Lunar Gateway: https://www.esa.int/Science_Exploration/Human_and_Robotic_Exploration/Exploration/Lunar_Gateway
- ESA: Moon Village: https://www.esa.int/Science_Exploration/Human_and_Robotic_Exploration/Exploration/Moon_Village
- ESA: A peek behind the lunar curtain: https://www.esa.int/Science_Exploration/Space_Science/The_moon/A_peek_behind_the_lunar_curtain
- a critical blog post by Healthline titled "How the Moon Affects Human Behavior" <https://www.rmg.co.uk/stories/topics/can-moon-affect-our-health-behaviour>
- which discusses the potential effects of the lunar cycle on mood and behavior, including those related to menstrual cycles
- and then read the scientific study: <https://www.frontiersin.org/articles/10.3389/fped.2016.00024/full>
- For further optional readings are recommended.
- <https://www.science.org/doi/10.1126/sciadv.abe0465>
- <https://www.mdpi.com/2079-7737/12/3/383>
- Circle(s) of Life: The Circadian Clock from Birth to Death

Assistive technologies for the blind

Daily tasks and object identification

- Seeing AI (iOS, free) – This app can narrate the world around you. ...
- Lookout (Android, free) – Provides spoken feedback about things around you. ...
- Be My Eyes (Android and iOS, free) – This app connects visually-impaired people with sighted volunteers through a live video call.

Inspiring project: A4BD project: blind, space edu: <https://www.a4bd.eu/>
France team: France
college-adam-de-villiers.ac-reunion.fr

Supporting Youth Resilience

[Resilience Research Centre](#)

<https://www.youtube.com/watch?v=od5a20mXDw4>

The Secret Life of Walter Mitty | Overcoming Maladaptive Daydreaming

<https://www.youtube.com/watch?v=Kj5XR32zs7E>

https://www.youtube.com/watch?v=Ay4_L1Rfkls&t=72s

Harvard Kennedy School **How *reappraisal* can help us cope with COVID-19**

Reducing the carbon footprint at schools

The study shows that emission of greenhouse gases from schools stand at 9.4 metric tonnes yearly. They spread from heating of school buildings, the students and staff wastes, also from the activities of companies providing goods and services to schools.

<https://www.co2nsensus.com/blog/reducing-carbon-footprint-in-schools>

Connect with schools for health

<https://eurohealthnet.eu/publication/schools4health/>

Youth4Health: A special initiative of the WHO Regional Director for Europe

Create account, get connected, engage in courses and projects <https://you4health.eu/>

<https://www.who.int/europe/activities/engaging-in-international-agreements-on-nature-biodiversity-and-health>

Tools: <https://www.who.int/europe/tools-and-toolkits>

ESA

Day, night & the seasons

https://www.esa.int/kids/en/learn/Lessons/Day_night_and_the_seasons

Moon

<https://sci.esa.int/web/smart-1/-/31412-moon>

Keeping the rhythm in space: circadian rhythm:

https://www.esa.int/Science_Exploration/Human_and_Robotic_Exploration/Research/Keeping_the_rhythm_in_space

[Bruno Latour:](#)

<https://www.sciencespo.fr/executive-education/video-bruno-latour>

[Gaia](#)

[Welcoming Hands, which was produced by Louise Bourgeois.](#)

https://www.eutouring.com/images_paris_statues_959.html

EU health policy: [EPRS_BRI\(2023\)739306_EN.pdf](#)

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