OrganKits
for STEAM

Co-funded by
the European Union

EDUCATIONAL GUIDE
to implement **OrganKits**

NEUMOHEALTH &ENVIRONMENT

organkitsproject.eu

NEUMOHEALTH&ENVIRONMENT

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PROJECT OF (choose one):

- ☐ SPORT-HEALTH
- ☐ MENTAL-HEALTH
- ☐ NUTRI-HEALTH
- ☑ NEUMO-HEALTH
- ☐ CARDIO-HEALTH
- ☐ REPRO-HEALTH

LEARN-STEM MODEL

- ☑ Complex
- ☑ Progress-oriented
- ☑ Holistic
- ☑ Practical
- ☑ Social

KEY COMPETENCES OF THE PROJECT

- ☑ Literacy
- ☑ Multilingual
- ☑ Mathematics, Science, Technology & Engineering
- ☑ Personal, social and learning to learn
- ☐ Citizenship
- ☐ Entrepreneurship
- ☐ Cultural awareness

SUSTAINABLE DEVELOPMENT GOALS OF THE PROJECT

- ☐ No poverty
- ☐ Zero Hunger
- ☑ Good Health and Well-being
- ☑ Quality Education
- ☐ Gender Equality
- ☐ Clean water and Sanitation
- ☐ Affordable and Clean Energy
- ☐ Decent Work and Economic Growth
- ☐ Industry, Innovation and Infrastructure
- ☐ Reduced Inequality
- ☑ Sustainable Cities and Communities
- ☐ Responsible Consumption and Production
- ☑ Climate Action
- ☐ Life Below Water
- ☑ Life on Land
- ☐ Peace and Justice Strong Institutions
- ☐ Partnerships to achieve the Goal

SUBJECTS OF THE CURRICULA worked in this project:

- [x] Mathematics
- [x] Language
- [ ] History
- [x] Biology
- [x] Physical Education
- [x] Art
- [x] Technology

GENERAL DESCRIPTION OF THE PROJECT:

Use of plastination can minimise health risks and cost in anatomy laboratories. Plastinated organs are easy to use and can facilitate learning of complex anatomical structures. Therefore, we aimed to evaluate the contribution of plastinated organ kits to teaching the complex anatomy of the body, more specifically of the respiratory system for our school.

2D educational materials such as textbooks, illustrations, and digital images may also be of limited benefit in understanding the three-dimensional complexity of anatomy and spatial relationships of structures. Plastination is a great method for long-term preservation of anatomical specimens.

With plastination, it is possible to preserve anatomical materials in a durable, aesthetic and realistic way. Therefore, plastinated specimens are valuable in anatomy teaching. For this reason, it is primordial to make interdisciplinary correlations between the respiratory system and the environment.

We can carry out these studies as a whole with interdisciplinary connections. These disciplines will be explained by establishing the connection between the respiratory system and daily life through disciplines such as biology, chemistry, mathematics, art, and physical education.

SPECIFIC STUDENTS' COMPETENCES TO DEVELOP (LEARNING OUTCOMES)

Learning through the Gestalt theory

Generate creative ideas

Interdisciplinary learning and teamwork

Analytical thinking Skills

Problem solving skills

Learn Cause- Effect relationship

Providing scientific arguments

Note Taking Skills

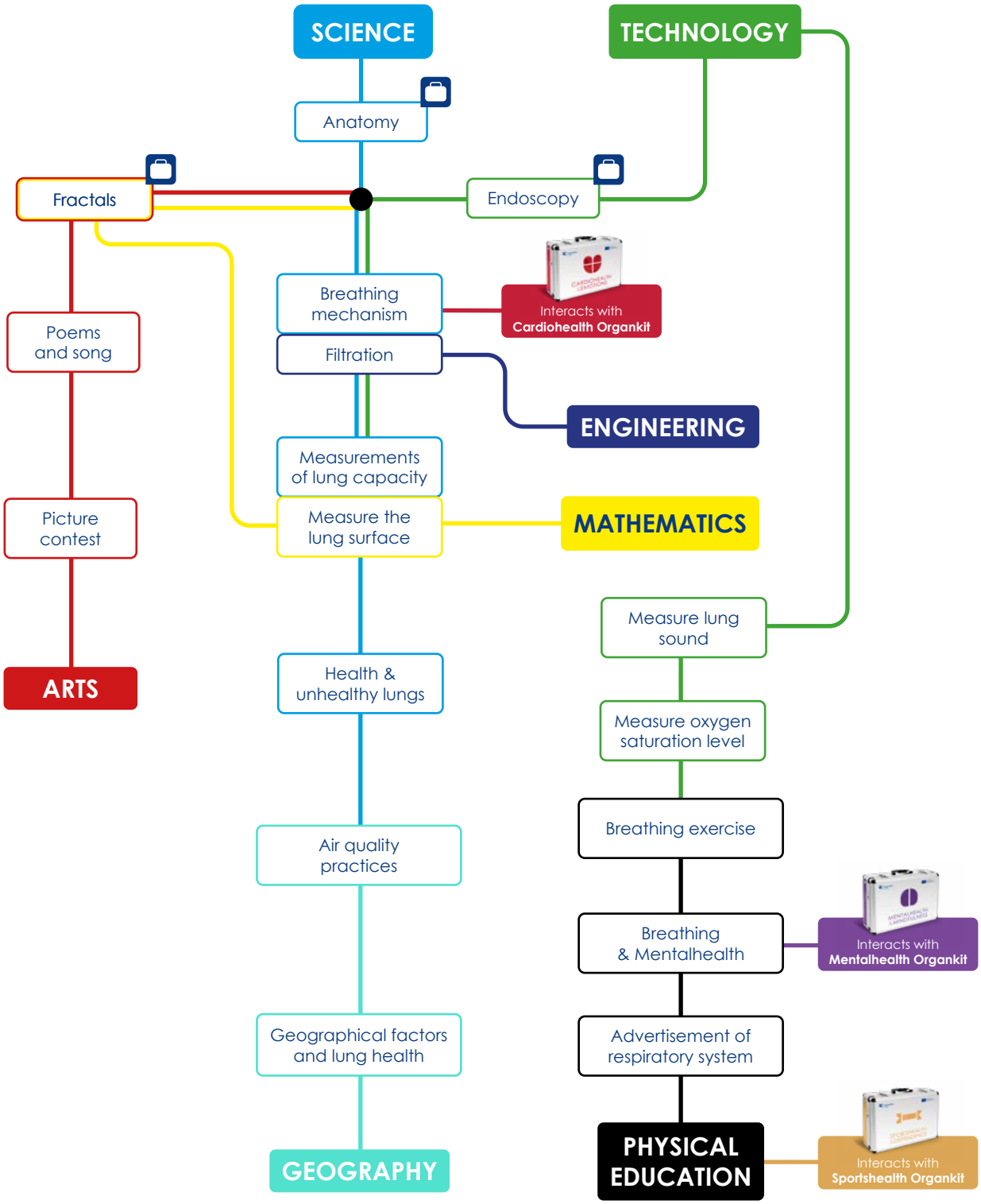
Time Management Skills

Develop Language Skills

Ability to prepare and make presentation

Improve Communication Skills

PROJECT MAP



* This activity uses the OrganKits case.

SCIENCE

LEARNING UNIT 1: ***RESPIRATORY SYSTEM: ANATOMY AND FUNCTION***

TASK 1. **VIDEO EXPLAINING HOW THE LUNGS FUNCTION ANATOMY (BRUNCHI, BRONCHIOLE & ALVEOLI)**

OBJECTIVES

- Communication
- Core competencies in Science and Technology
- Reach target achievements
- Increase academic achievement
- Learning to learn competence
- Digital competence

MAIN QUESTIONS TO BE ANSWERED BY STUDENTS MAKING THIS PROJECT

- Do you know the main structure of the Human Respiratory system?
- What do you know about lung anatomy?
- Does the lung have muscle? If not, how does the air that goes in get out?
- The muscles for breathing are the intercostal muscles of the ribs and the _____. *(A: diaphragm)*
- The functions of the respiratory system include gas exchange, sound production, olfactory assistance, protection, and _____ (or the movement of air). *(A: breathing)*
- True or False: The respiratory function of gas exchange and breathing help to maintain homeostasis of acid-base balance or pH levels in the body. *(A: true)*
- What role do cilia of epithelial cells lining the respiratory tract play? *(A: They sweep away dust or particles trapped by mucus)*
- What is breathing?
- What is the respiratory system?
- What are the main organs of the respiratory system?
- What air do we take in and give out when we breathe?
- The process of moving air in and out of the body is called _____.
- An organ is the special part of the body that has a specific form and function.
- The group of organs in your body that enables us to breathe is called the _____ system.
- The muscle that makes our lungs larger and smaller during breathing is called the _____.
- What are the major organs of the respiratory system?
- How does the diaphram help the lungs to move when breathing?
- Lungs get bigger as diaphragm contracts and air comes into our lungs as we inhale.
- Lungs get smaller as the diaphragm relaxes and air is forced out of our lungs as we exhale.

STUDENTS´ ORGANIZATION

Groups of 4 students.

TIME

4 sessions

PROCESS OF WORK (PHASES AND ASSIGNMENTS/ACTIVITIES)

At first, the students search for the information in relation to the questions directed by their teachers. They analyse the anatomical formation of the lungs.

With the aid of the plastinated organs and using the information they obtained from reliable websites, their teacher, textbook materials, students will share duties and decide how to record an informative video for the main component of the respiratory system including the trachea, bronchi, bronchiole, alveoli.

RESOURCES

- Neumohealth OrganKit.
- Smartphone/video camera.
- Textbooks
- Reliable source of information from the internet.
- Assessment and Evaluation

Video

ASSESSMENT AND EVALUATION

Student assessment scale	**(100)**
Conveying scientifically correct information	20
Analysing scientific collected information	20
Using the appropriate scientific language	10
Presentation of the information	10
Reporting of the resources used & its reliability	10
Timely execution of the tasks	10
Ability to achieve targeted goals	20

TASK 2. **BREATHING MECHANISM THROUGH SIMPLE EXPERIMENTS**

OBJECTIVES

- Communication
- Core competencies in Science and Technology
- Reach target achievements
- Increase academic achievement
- Learning to learn competence
- Digital competence

MAIN QUESTIONS TO BE ANSWERED BY STUDENTS MAKING THIS PROJECT

- How does oxygen gas enter the lungs and release carbon dioxide gas?
- Is there a muscle in the lung? If not, how does the air that goes in get out?
- Which part of the lung model represents the lungs? *(A: The balloon)*
- Which part of the lung model represents the thin sheet of muscle? *(A: The half cut-off balloon)*
- What is the work of the sheet of muscle? *(A: It changes the size of lungs, etc)*
- How does the sheet of muscle move? *(A: It goes up and down, etc.)*
- Can you guess what happens to the sheet of muscle when we breathe in or out? *(A: It moves down when we breathe in and moves up when we breathe out.)*
- What helps lungs become bigger and smaller?
- Which body parts help us breathe?
- How does the diaphragm help when we breathe in and out?
- How changes in internal and external pressure affect breathing?

STUDENTS´ ORGANIZATION

Groups of 4 students.

TIME

2 sessions.

PROCESS OF WORK (PHASES AND ASSIGNMENTS/ACTIVITIES)

Watch resource video

- Cut the bottom of the plastic bottle
- Bend the wire and add it the bottom of the bottle
- Use the Y pipe, attach the 2 balloons with the elasticated bans to the 2 ends of the Y pipe.
- Insert the straw to the other end of the Y pipe
- Make a hole in the bottle lid and pass the Y pipe inside the bottle though the lid as per the below video.

RESOURCES

- To make the respiratory system: 2 small balloons and 1 big balloon, straws, a 2-litre empty plastic bottle with cap and 2 rubber bands (2 min), pliers and wires, Y type of pipe
- Silicone gun
- Scissors or knife / cutter
- Smartphone/video camera.
- Video of experiment from the internet.

Instructions Video

ASSESSMENT AND EVALUATION

Student assessment scale	**(100)**
Conveying scientifically correct information	30
Presentation of the information	40
Reporting of the resources used & its reliability	10
Timely execution of the tasks	10
Ability to achieve targeted goals	10

TASK 3. **HEALTHY LUNG VS UNHEALTHY LUNG EXPERIMENT**

OBJECTIVES

- Communication
- Core competencies in Science and Technology
- Learning to learn competence
- Reach target achievements
- Increase academic achievement
- Digital competence

MAIN QUESTIONS TO BE ANSWERED BY STUDENTS MAKING THIS PROJECT

- Can we live with one lung?
- Questionnaire to be answered by students.

STUDENTS´ ORGANIZATION

Groups of 4 students.

TIME

2 sessions.

PROCESS OF WORK (PHASES AND ASSIGNMENTS/ACTIVITIES)

Questionnaire to students:

- Do you have a new, persistent or changed cough?
- Do you cough up mucus or phlegm?
- Do you get out of breath more easily than others your age?
- Do you experience chest tightness or wheeze?
- Do you experience recurrent chest infections?
- Do you experience chest pain or have unexplained weight loss?
- Are you a smoker or ex-smoker?
- Do you cough up blood or have blood in your mucus or phlegm?
- Have you ever worked in a job that exposed you to dust, gas or fumes?

RESOURCES

- Smartphone/video camera.
- Video of experiment from the internet.
- Assessment and Evaluation

Video 1 Video 2 Video 3

Video 4 Video 5

ASSESSMENT AND EVALUATION

Student assessment scale	**(100)**
Conveying scientifically correct information	30
Presentation of the information	40
Reporting of the resources used & its reliability	10
Timely execution of the tasks	10
Ability to achieve targeted goals	10

TASK 4. **MEASUREMENT OF THE RESPIRATORY RATE / USE OF SPIROMETER**

OBJECTIVES

- Communication
- Core competencies in Science and Technology
- Learning to learn competence
- Reach target achievements
- Increase academic achievement
- Digital competence

MAIN QUESTIONS TO BE ANSWERED BY STUDENTS MAKING THIS PROJECT

- What is the capacity of your lungS?
- How many Litres is lung capacity?
- What factors affect lung capacity? *Factors such as age, sex, body build, and physical conditioning have an influence on lung volumes and capacities. Lungs usually reach their maximum in capacity in early adulthood and decline with age after that.*
- How does lung capacity increase? *When you are physically active, your heart and lungs work harder to supply the additional oxygen your muscles demand. Just like regular exercise makes your muscles stronger, it also makes your lungs and heart stronger.*
- How much lung capacity do we use? *In healthy people without chronic lung disease, even at maximum exercise intensity, we only use 70 percent of the possible lung capacity.*

STUDENTS´ ORGANIZATION

Groups of 4 students.

TIME

2 sessions.

PROCESS OF WORK (PHASES AND ASSIGNMENTS/ACTIVITIES)

When the students pull the syringe they can see the balloon blowing, representing the inhaling mechanism. On the opposite, when they push it, the balloon deflates showing the exhaling mechanism of breathing.

- What part of the syringe can be compared with the diaphragm? The mouth? The chest cavity?
- Why is water, rather than air, used in this model?

RESOURCES

- Seringue
- Balloon
- Water
- Smartphone/video camera.
- Video of experiment from the internet.

Video 1

ASSESSMENT AND EVALUATION

Student assessment scale	**(100)**
Conveying scientifically correct information	30
Presentation of the information	40
Reporting of the resources used & its reliability	10
Timely execution of the tasks	10
Ability to achieve targeted goals	10

TECHNOLOGY

LEARNING UNIT 2: ***TECHNOLOGY AND RESPIRATORY SYSTEM***

TASK 1. **ENDOSCOPY**

OBJECTIVES

- Communication
- Core competencies in Science and Technology
- Reach target achievements
- Increase academic achievement
- Learning to learn competence
- Digital competence

MAIN QUESTIONS TO BE ANSWERED BY STUDENTS MAKING THIS PROJECT

- What is the structure of the lung? How does it look?
- What is the structure of tracheal bronchial bronchioles? How does it look?
- Is there a difference between the images of healthy and unhealthy lungs?
- What differences did you observe in the structure of the trachea and bronchi?
- What differences did you observe in the external appearance of the right and left lung?

STUDENTS´ ORGANIZATION

Groups of 4 students.

TIME

2 sessions.

PROCESS OF WORK (PHASES AND ASSIGNMENTS/ACTIVITIES)

- Healthy and unhealthy lung organkits are taken.
- First, an endoscopy is placed inside the unhealthy lung, and the trachea, bronchi, bronchioles are examined with a camera in the screenshot. Necessary notes are taken.
- The differences between healthy and unhealthy lungs are brainstormed between groups and a digital concept map is created. As a result of all these results, he/she understands what needs to be done to protect lung health. Examines the environments conducive to lung health.

RESOURCES

- Neumohealth OrganKit (healthy / unhealthy)
- Endoscopy
- Smartphone/video camera
- Assessment and Evaluation form

ASSESSMENT AND EVALUATION

Student assessment scale	**(100)**
Conveying scientifically correct information	20
Analysing scientific collected information	10
Using the appropriate scientific language	10
Presentation of the information	10
Appropriate use of technology	30
Timely execution of the tasks	10
Ability to achieve targeted goals	10

TASK 2. **MEASUREMENT LUNG SOUNDS TO DETERMINE HEALTH (STETHOSCOPE)**

OBJECTIVES

- Communication
- Core competencies in Science and Technology
- Reach target achievements
- Increase academic achievement
- Learning to learn competence
- Digital competence

MAIN QUESTIONS TO BE ANSWERED BY STUDENTS MAKING THIS PROJECT

- How many breaths per minute do adults normally breathe?
- How is the analysis of the sounds produced by the movement of the inhaled air in the lungs, its interaction with the tissues and its vibration, and the analysis of the sounds in people with lung disease?
- How would you explain the sound vibration difference in healthy and unhealthy lungs with auscultation?

STUDENTS´ ORGANIZATION

Groups of 4 students.

TIME

1 session.

PROCESS OF WORK (PHASES AND ASSIGNMENTS/ACTIVITIES)

People with healthy and unhealthy lungs are divided into two groups. With the help of a stethoscope, Students listen to the sound produced by the sample lungs. After listening to the lung sounds, the students try to detect if there is a sign of a disease or try to name the diseases.

RESOURCES

- Subject human (in case there is no subject, digital media is used)
- Stethoscope
- Assessment and Evaluation form

Video 1 Video 2

ASSESSMENT AND EVALUATION

Student assessment scale	**(100)**
Conveying scientifically correct information	20
Analysing scientific collected information	10
Using the appropriate scientific language	10
Presentation of the information	10
Appropriate use of technology	30
Timely execution of the tasks	10
Ability to achieve targeted goals	10

TASK 3. **MEASUREMENT OF THE OXYGEN SATURATION LEVELS**

OBJECTIVES

- Communication
- Core competencies in Science and Technology
- Reach target achievements
- Increase academic achievement
- Learning to learn competence
- Digital competence

MAIN QUESTIONS TO BE ANSWERED BY STUDENTS MAKING THIS PROJECT

- What should be the typical oxygen saturation level of a healthy person?
- What should be the oximeter level in the elderly with chronic diseases?
- How long can the brain and heart survive without oxygen?
- What should be considered when using the oximeter?
- What are the health problems that require regular use of the oximeter?
- What are the differences between phone and oximeter measurement?

STUDENTS´ ORGANIZATION

Groups of 4 students.

TIME

1 session.

PROCESS OF WORK (PHASES AND ASSIGNMENTS/ACTIVITIES)

Measurements are made with a telephone and an oximeter.
Compare the two set of measurements.

RESOURCES

- Neumohealth OrganKit
- Smartphone/video camera QR Code
- Design of the game questions
- Assessment and Evaluation form
- Pulse Oxymeter

Info Video

ASSESSMENT AND EVALUATION

Student assessment scale	**(100)**
Conveying scientifically correct information	20
Analysing scientific collected information	10
Using the appropriate scientific language	10
Presentation of the information	10
Reporting of the resources used & its reliability	10
Timely execution of the tasks	10
Ability to achieve targeted goals	20

ENGINEERING

LEARNING UNIT 3: ***DESIGNING AND BUILDING FILTERS***

TASK 1. **MAKE A FILTER**

OBJECTIVES

- Communication
- Core competencies in Science and Technology
- Reach target achievements
- Increase academic achievement
- Learning to learn competence
- Digital competence

MAIN QUESTIONS TO BE ANSWERED BY STUDENTS MAKING THIS PROJECT

- What is the relationship between the heart and the lungs?
- How does the lung clean the blood?

STUDENTS´ ORGANIZATION

Groups of 4 students.

TIME

2 sessions.

PROCESS OF WORK (PHASES AND ASSIGNMENTS/ACTIVITIES)

Use the below materials to create a prototype of the air cleaning mechanism of the lung using engineering skills.

RESOURCES

- Heart organkit
- Lung organkit
- Hose, Pump
- Pollen air conditioner filter
- Scissors, Tyre
- Coloured papers
- Tape, Glue
- Paper cup, wooden stick vacuum tool, Straws, Egg carton

Note: materials can be removed and added.

Info

ASSESSMENT AND EVALUATION

Student assessment scale	**(100)**
Conveying scientifically correct information	20
Achieve the purpose of the experiment	40
Recycling material used	20
Presentation of the information	10
Functioning final product	10

ART

LEARNING UNIT 4: ***EXPLORING PATTERNS AND EXPRESSIONS: FRACTALS IN NATURE AND ARTISTIC POETRY***

TASK 1. **FRACTALS IN NATURE**

OBJECTIVES

- Communication competence
- Develop Artistic skills
- Core competencies in Science and Technology
- Reach target achievements
- Increase academic achievement
- Learning to learn competence
- Digital competence

MAIN QUESTIONS TO BE ANSWERED BY STUDENTS MAKING THIS PROJECT

- What is the relationship between the heart and the lungs?
- How does the lung clean the blood?

STUDENTS´ ORGANIZATION

Groups of 4 students.

TIME

2 sessions.

PROCESS OF WORK (PHASES AND ASSIGNMENTS/ACTIVITIES)

The repetitive structure of the alveoli is examined on the organkits, and similar structures in nature are examined and adapted from an artistic point of view.. These drawings and art pieces will be displayed in an exhibition in each school.

RESOURCES

- Pen
- Paper
- Paint
- Brushes
- Canvas
- Any other art material to enhance creativity

Info Video

ASSESSMENT AND EVALUATION

Student assessment scale	**(100)**
Conveying scientifically correct information	20
Use of art for the intended purpose	30
Reporting of the resources used & its reliability	30
Timely execution of the tasks	10
Ability to achieve targeted goals	10

TASK 2. **POEMS**

OBJECTIVES

- Communication competence
- Develop artistic skills
- Core competencies in Science and Technology
- Raise awareness on climate change / environmental issues
- Reach target achievements
- Increase academic achievement
- Learning to learn competence
- Digital competence

MAIN QUESTIONS TO BE ANSWERED BY STUDENTS MAKING THIS PROJECT

- What are the techniques used when writing poems?

STUDENTS´ ORGANIZATION

Groups of 4 students.

TIME

2 sessions.

PROCESS OF WORK (PHASES AND ASSIGNMENTS/ACTIVITIES)

- Students are first given techniques about various ways to write a poem.
- Based on these techniques, students write poems in relation to the respiratory system, lungs and aim at incorporating the environmental implication.
- Poems can be written in various languages.
- The use of creativity is encouraged.

RESOURCES

- Pen
- Paper
- Any other art material to enhance creativity

ASSESSMENT AND EVALUATION

Student assessment scale	**(100)**
Conveying scientifically correct information	20
Use of art for the intended purpose	30
Reporting of the resources used & its reliability	30
Timely execution of the tasks	10
Ability to achieve targeted goals	10

Lungs

When
You put your
ear to the
fertile soil
the respiratory systems
of the jungle of Malaysia
breathe for you, In through the roots
out through the cartilage the fingers that tingle gently
always sensing. It reaches out to be seized, held, waving
to be picked up. The rambutan inhaling and exhaling in its place
branches jutted together waiting out its life to be taken, tossed into
wooden buckets sold by the pound at bustling night markets. For now, only
bronchi in the foliage, growing slowly in Malaysia's lungs, held in the hands of
those above. For now. The fruit dangles, alveoli. Two hundred sixteen thousand.
each glistens with dew in the mornings emanating honey from seven to eleven
growing in the night until finally each trachea would be torn and separated
rib - by - rib All that is left is the beating seed
the heavenly juice flowing through each vein, stripped
of those fingers that used to feel the breeze
the nerves are gone.

Link

TASK 3. **PICTURE CONTEST**

OBJECTIVES

- Communication competence
- Develop artistic skills and learn new techniques
- Raise awareness on climate change / environmental issues
- Core competencies in Science and Technology
- Reach target achievements
- Increase academic achievement
- Learning to learn competence
- Digital competence

MAIN QUESTIONS TO BE ANSWERED BY STUDENTS MAKING THIS PROJECT

- How can you represent the relationship between the lungs and environment from an artistic point of view?
- What is environmental concept art?
- What is marbling technique?

STUDENTS´ ORGANIZATION

Groups of 3 students.

TIME

2/3 sessions.

PROCESS OF WORK (PHASES AND ASSIGNMENTS/ACTIVITIES)

Firstly, students are introduced to environmental concept art type of art and marbling techniques.

Then students are asked to put their perception of the relationship between the environment and the respiratory system into a creative piece of art.

Students can use the new concept of Environmental art introduced or the marbling technique to illustrate this topic of lungs / respiratory system and its environmental implication. They can focus on climate change in particular.

RESOURCES

- Pen
- Paper
- Marble paints
- Any other art material to enhance creativity

Info 1

ASSESSMENT AND EVALUATION

Student assessment scale	**(100)**
Conveying scientifically correct information	20
Use of art for the intended purpose	30
Reporting of the resources used & its reliability	30
Timely execution of the tasks	10
Ability to achieve targeted goals	10

Link

TASK 4. **WIND INSTRUMENTS & LUNG HEALTH**

OBJECTIVES

- Communication competence
- Develop Artistic skills
- Develop Analytical skills
- Core competencies in Science and Technology
- Reach target achievements
- Increase academic achievement
- Learning to learn competence
- Digital competence

MAIN QUESTIONS TO BE ANSWERED BY STUDENTS MAKING THIS PROJECT

- What impact do wind instruments have on the lungs?
- How does playing a wind instrument affect your lungs?
- What are the benefits of playing a wind instrument? Is it good for asthma?

STUDENTS´ ORGANIZATION

Groups of 4 students.

TIME

6 sessions.

PROCESS OF WORK (PHASES AND ASSIGNMENTS/ACTIVITIES)

All students are asked to fill in a questionnaire.

In the questionnaire students are asked about students who play a wind instrument and the length of time.

If there aren't any students who play a wind instrument, a test group is formed asking students to practise playing wind instruments for a period of time (6 weeks).

Students' breaths are measured with two spirometric tests, one before and one after the rehearsal. Respiratory volumes measured and analysed for a period of time (6 weeks).

RESOURCES

- Pen
- Paper
- Any other art material to enhance creativity

ASSESSMENT AND EVALUATION

Student assessment scale	**(100)**
Registering of data appropriately	30
Analysing scientific collected information	30
Reporting of the resources used & its reliability	20
Timely execution of the tasks	10
Ability to achieve targeted goals	10

MATHEMATICS

LEARNING UNIT 5: ***EXPLORING FRACTALS AND SURFACE-TO-VOLUME RATIOS***

TASK 1. **FRACTALS**

OBJECTIVES

- Communication competences
- Core competencies in Science and Mathematics
- Reach target achievements
- Increase academic achievement
- Learning to learn competence
- Digital competence

MAIN QUESTIONS TO BE ANSWERED BY STUDENTS MAKING THIS PROJECT

- What regular pattern do you see in the alveoli of the lung? What kind of cycle does it involve?
- Do you think we can see this in mathematics? What subjects can you compare?
- Fractal drawing explained mathematically (repetition)
- Problems are solved with modular arithmetic method

STUDENTS´ ORGANIZATION

Groups of 4 students.

TIME

2 sessions.

PROCESS OF WORK (PHASES AND ASSIGNMENTS/ACTIVITIES)

- The alveoli on the surface of the organkits are examined.
- The repetitive structure of one of the alveoli is highlighted. This is explained mathematically as in the video below.
- Mathematical problems are given and modular arithmetic operations are applied.

RESOURCES

- Neumohealth OrganKit (healthy / unhealthy)
- Smartphone/video camera
- Assessment and Evaluation form

Video 1 Video 2

ASSESSMENT AND EVALUATION

Student assessment scale	**(100)**
Conveying scientifically correct information	20
Analysing scientific collected information	10
Using the appropriate scientific language	10
Presentation of the information	10
Appropriate use of technology	30
Timely execution of the tasks	10
Ability to achieve targeted goals	10

TASK 2. **SURFACE TO VOLUME RATIO**

OBJECTIVES

- Communication competences
- Core competencies in Science and Mathematics
- Reach target achievements
- Increase academic achievement
- Learning to learn competence
- Digital competence

MAIN QUESTIONS TO BE ANSWERED BY STUDENTS MAKING THIS PROJECT

- How to calculate surface area to volume ratio?
- What is the ratio of volume to surface area?
- How to calculate three-dimensional objects' surface?
- What is the surface of the lungs? (use of the organkit)
- What is the volume of the lungs?

STUDENTS´ ORGANIZATION

Groups of 4 students.

TIME

2 sessions.

PROCESS OF WORK (PHASES AND ASSIGNMENTS/ACTIVITIES)

- The surface of the organkits are examined.
- Students look at 3D Mathematical problems and calculate the surface / volume of these objects including the lungs.

RESOURCES

- Neumohealth OrganKit (healthy / unhealthy)
- Smartphone/video camera
- Assessment and Evaluation form

ASSESSMENT AND EVALUATION

Student assessment scale	**(100)**
Conveying scientifically correct information	20
Analysing scientific collected information	10
Using the appropriate scientific language	10
Presentation of the information	10
Appropriate use of technology	30
Timely execution of the tasks	10
Ability to achieve targeted goals	10

PHYSICAL EDUCATION

LEARNING UNIT 6: ***PHYSICAL EXERCISE & HEALTHY LUNGS***

TASK 1. **PHYSICAL EXERCISE & HEALTHY LUNGS**

OBJECTIVES

- Communication competence
- Core competencies in Physical Education, Health and Wellbeing
- Reach target achievements
- Increase academic achievement
- Learning to learn competence
- Digital competence

MAIN QUESTIONS TO BE ANSWERED BY STUDENTS MAKING THIS PROJECT

- What are the differences between the lungs of those who do sports and those who do not?

STUDENTS´ ORGANIZATION

Groups of 4 students.

TIME

1 session.

PROCESS OF WORK (PHASES AND ASSIGNMENTS/ACTIVITIES)

- Exercises and activities that should be done for healthy lungs
- Brainstorming
- Information research
- Yoga, breathing exercises, running / walking, aerobic, walking, jumping, pilates, weight lifting, cardio.
- Select one activity from the activity list and show how it applies to daily life.

RESOURCES

- Smartphone/video camera
- Assessment and Evaluation form

ASSESSMENT AND EVALUATION

Student assessment scale	**(100)**
Conveying scientifically correct information	20
Analysing scientific collected information	20
Using the appropriate scientific language	10
Presentation of the information	10
Reporting of the resources used & its reliability	10
Timely execution of the tasks	10
Ability to achieve targeted goals	20

TASK 2. **ADVERTISEMENT**

OBJECTIVES

- Communication competence
- Core competencies in Physical Education, Health and Wellbeing
- Reach target achievements
- Increase academic achievement
- Learning to learn competence
- Digital competence

MAIN QUESTIONS TO BE ANSWERED BY STUDENTS MAKING THIS PROJECT

- What activities can we do to improve our health? particularly our lungs' health?

STUDENTS´ ORGANIZATION

Groups of 4 students.

TIME

1 session.

PROCESS OF WORK (PHASES AND ASSIGNMENTS/ACTIVITIES)

- Student will design a social media campaign promoting healthy lungs.

RESOURCES

- Smartphone/video camera QR Code
- Design of the game questions
- Assessment and Evaluation form

Video

ASSESSMENT AND EVALUATION

Student assessment scale	**(100)**
Conveying scientifically correct information	20
Analysing scientific collected information	20
Using the appropriate scientific language	10
Presentation of the information	10
Reporting of the resources used & its reliability	10
Timely execution of the tasks	10
Ability to achieve targeted goals	20

TASK 3. **YOGA, MEDITATION & HEALTHY LUNGS**

OBJECTIVES

- Communication competences
- Core competencies in Science and Technology
- Reach target achievements
- Increase academic achievement
- Learning to learn competence
- Digital competence

MAIN QUESTIONS TO BE ANSWERED BY STUDENTS MAKING THIS PROJECT

- What are the effects of the contribution of yoga and meditation to mental health on the lungs?

STUDENTS´ ORGANIZATION

Groups of 4 students.

TIME

Several sessions during school term. Can be during one semester / one month enough to evaluate the effect of breathing / yoga exercises.

PROCESS OF WORK (PHASES AND ASSIGNMENTS/ACTIVITIES)

- Regular breathing by doing yoga and meditation exercise.

RESOURCES

- Yoga Videos
- Breathing exercises
- Pre and post Assessment and Evaluation form on how students feel after regular breathing exercise.

Video 1

Video 2

Video 3

TASK 4. **BREATHING EXERCISE AND EFFECT ON LUNGS**

OBJECTIVES

- Communication competence
- Core competencies in Science and Technology
- Reach target achievements
- Increase academic achievement
- Learning to learn competence
- Digital competence

MAIN QUESTIONS TO BE ANSWERED BY STUDENTS MAKING THIS PROJECT

- What are the effects of breathing exercises on the lungs?
- Many factors such as ageing, smoking, air pollution, inactivity and malnutrition reduce the working efficiency of the lungs and cause lung diseases such as COPD and asthma. Give examples of exercises to be done to increase the lung capacity, which has decreased due to these.

STUDENTS´ ORGANIZATION

Groups of 4 students.

TIME

1 session.

PROCESS OF WORK (PHASES AND ASSIGNMENTS/ACTIVITIES)

- Pulmonary health is interpreted by having students do different breathing exercises and have their pulse / heart rate measured.

RESOURCES

- Smartphone/video camera QR Code
- Assessment and Evaluation form

Video

ASSESSMENT AND EVALUATION

Student assessment scale	**(100)**
Conveying scientifically correct information	20
Analysing scientific collected information	20
Using the appropriate scientific language	10
Presentation of the information	10
Reporting of the resources used & its reliability	10
Timely execution of the tasks	10
Ability to achieve targeted goals	20

GEOGRAPHY

LEARNING UNIT 6: ***GEOGRAPHIC INFLUENCES ON HEALTH: ANALYZING ENVIRONMENTAL FACTORS AND OXYGEN LEVELS***

TASK 1. **GEOGRAPHIC FACTORS ON NEUMOHEALTH**

OBJECTIVES

- Communication competence
- Core competencies in Science and Technology
- Reach target achievements
- Increase academic achievement
- Learning to learn competence
- Digital competence

MAIN QUESTIONS TO BE ANSWERED BY STUDENTS MAKING THIS PROJECT

- What are the geographical / environmental factors helping to improve the quality of the air?

STUDENTS´ ORGANIZATION

Groups of 4 students.

TIME

1 session.

PROCESS OF WORK (PHASES AND ASSIGNMENTS/ACTIVITIES)

- Students will prepare a podcast about the environmental factors that contribute to the improvement of the air quality.

RESOURCES

- Smartphone/video camera
- Design of the game questions
- Assessment and Evaluation form

ASSESSMENT AND EVALUATION

Student assessment scale	**(100)**
Conveying scientifically correct information	20
Analysing scientific collected information	20
Using the appropriate scientific language	10
Presentation of the information	10
Reporting of the resources used & its reliability	10
Timely execution of the tasks	10
Ability to achieve targeted goals	20

TASK 2. **MEASUREMENT OF THE OXYGEN SATURATION LEVELS**

OBJECTIVES

- Communication in mother tongue
- Communication in a foreign language
- Core competencies in Science and Technology
- Reach target achievements
- Increase academic achievement
- Learning to learn competence
- Digital competence

MAIN QUESTIONS TO BE ANSWERED BY STUDENTS MAKING THIS PROJECT

- What are respiratory system diseases?
- What diseases are caused by the environment?

STUDENTS´ ORGANIZATION

Groups of 4 students.

TIME

2/3 sessions.

PROCESS OF WORK (PHASES AND ASSIGNMENTS/ACTIVITIES)

- Students will prepare a **presentation / brochure** on the air pollution of their country.
- Students should do some research and map the air pollution rate in each country and explain why the air quality is good or poor based on environmental facts.
- An air quality map and factors will be specified (each country will issue it for its own country)
- A map showing the air quality and environmental characteristics of your country should be drawn.
- What should be done to improve air quality? research and presentation in a podcast.
- It should be supported by real examples.
- Students will investigate practices that are not yet implemented in their country but in place in other countries to improve air quality.

RESOURCES

- Internet
- Smartphone/video camera
- Assessment and Evaluation form
- Digital tools to make a map
- Paper map

Info

ASSESSMENT AND EVALUATION

Student assessment scale	**(100)**
Conveying scientifically correct information	20
Analysing scientific collected information	20
Using the appropriate scientific language	10
Presentation of the information	10
Reporting of the resources used & its reliability	10
Timely execution of the tasks	10
Ability to achieve targeted goals	20

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