OrganKits
for STEAM

Co-funded by
the European Union

EDUCATIONAL GUIDE
to implement **OrganKits**

NUTRIHEALTH & WELLNESS

organkitsproject.eu

NUTRIHEALTH&WELLNESS

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PROJECT OF (choose one):

- [ ] SPORT-HEALTH
- [ ] NEUMO-HEALTH
- [ ] MENTAL-HEALTH
- [ ] CARDIO-HEALTH
- [x] NUTRI-HEALTH
- [ ] REPRO-HEALTH

LEARN-STEM MODEL

- [x] Complex
- [x] Progress-oriented
- [x] Holistic
- [x] Practical
- [x] Social

KEY COMPETENCES OF THE PROJECT

- [ ] Literacy
- [ ] Multilingual
- [x] Mathematics, Science, Technology & Engineering
- [x] Personal, social and learning to learn
- [ ] Citizenship
- [ ] Entrepreneurship
- [ ] Cultural awareness

SUSTAINABLE DEVELOPMENT GOALS OF THE PROJECT

- [ ] No poverty
- [x] Zero Hunger
- [x] Good Health and Well-being
- [x] 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
- [x] 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:

This project aims to create an innovative approach to teaching Nutri-health and Wellness by using plastinated organs as teaching tools in the classroom. The use of plastinated organs offers a unique and engaging way to educate students about the human body and its connection to food and nutrition.

The project will follow a project-based learning approach that integrates STEM education with nutrition and health-related subjects. The project-based learning approach will allow students to actively engage in the learning process through hands- on activities, group work, and problem-solving tasks.

Students will examine different plastinated organs related to nutrition and health, such as the stomach or small intestine. They will identify its different parts and functions and discuss how it is related to the overall process of nutrient digestion and absorption in the body. Students will also learn about healthy eating habits, the importance of nutrient balance, and the prevention of chronic diseases.

To further enhance their learning experience, students will be assigned tasks related to nutrition and health. Through this project, students will develop a deeper understanding of the human body and its connection to food and nutrition. They will also learn about the importance of healthy eating habits and the role they play in preventing chronic diseases. By using plastinated organs as teaching tools and following a project-based learning approach, this project offers a unique and engaging way to teach nutrition, health, and wellness in the classroom while integrating STEM education.

SPECIFIC STUDENTS' COMPETENCES TO DEVELOP (LEARNING OUTCOMES)

Problem solving

Critical and analytical thinking

Team working and communication skills

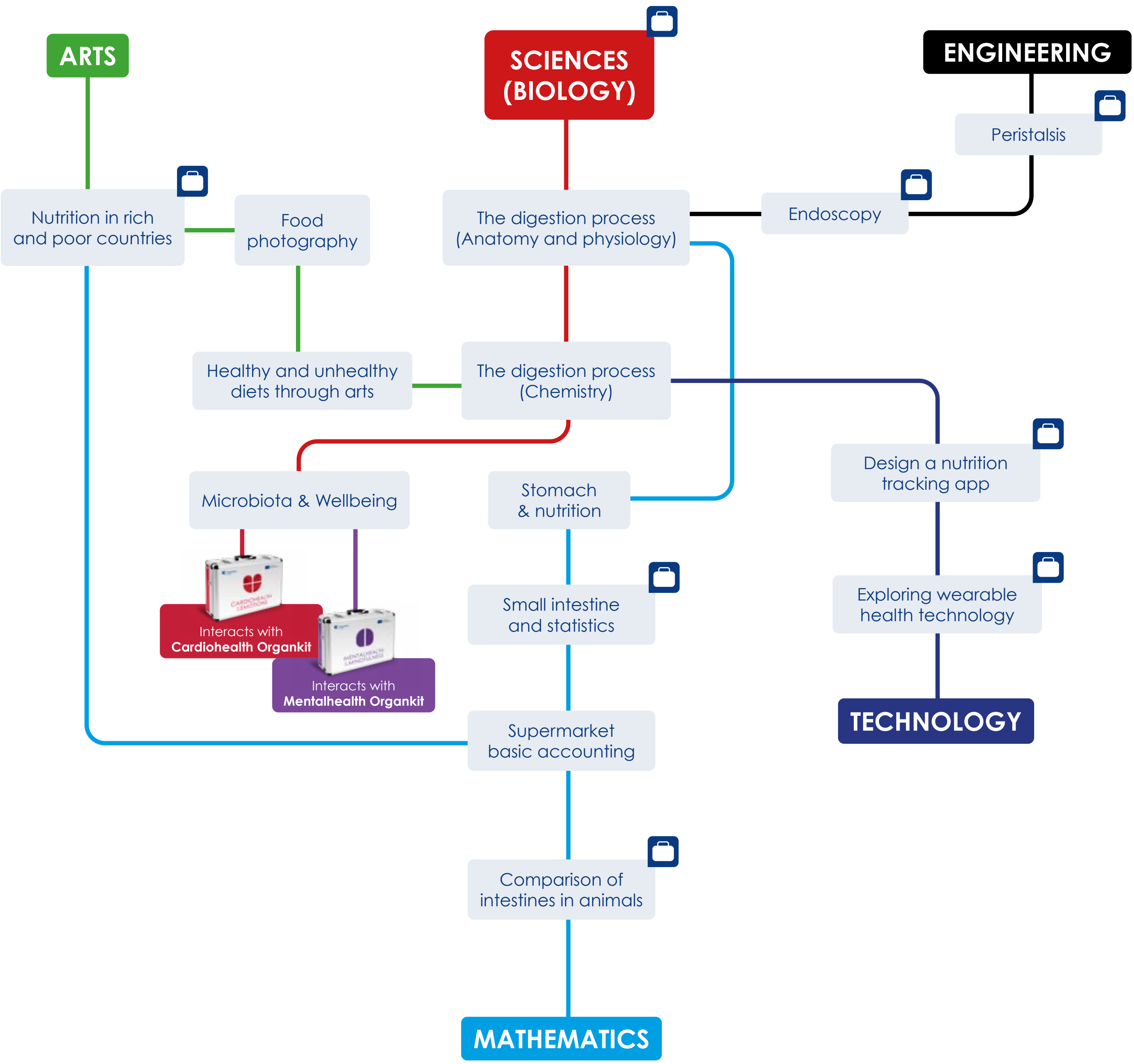
Creativity

Time management

ICT tools use

Arguing and debating

PROJECT MAP



* This activity uses the OrganKits case.

SCIENCE

LEARNING UNIT 1: ***THE DIGESTIVE SYSTEM***

TASK 1. **THE DIGESTIVE SYSTEM: ANATOMY AND PHYSIOLOGY**

OBJECTIVES

- Understand the anatomy and physiology of the digestive system.
- Explore the role of the stomach and small intestine in the digestion process.
- Investigate the relationship between the digestive system and the overall health of the body.

MAIN QUESTIONS TO BE ANSWERED BY STUDENTS MAKING THIS PROJECT

- What are the different organs involved in the digestive system?
- How does the stomach and small intestine work together to digest food?
- What are some common digestive disorders and how can they be prevented?

STUDENTS´ ORGANIZATION

Groups of 4.

TIME

2 sessions.

PROCESS

Session 1

Teacher explains the anatomy and physiology of the digestive system, including the structure and function of the stomach and small intestine.

Students use plastinated organs to explore the different parts of the digestive system and their functions. Students do research and create a list of healthy foods that promote digestive health and a list of foods that should be avoided.

Session 2

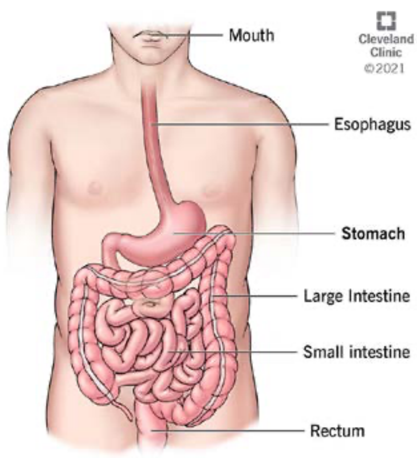
Students present their findings to the class, using diagrams or models to illustrate the digestive process. They use plastinated organs to demonstrate the role of the stomach and small intestine in the digestion process. In the end they discuss common digestive disorders and provide suggestions for prevention.

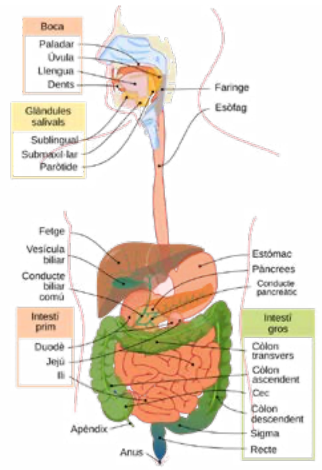
RESOURCES

- Plastinated organs of the digestive system
- Computer with access to internet
- Textbooks

Video 1 Video 2 Video 3

Video 4 Video 5 Info





Link Link

ASSESSMENT & EVALUATION

Students will be evaluated based on the accuracy of their research and the clarity and effectiveness of their presentation.

TASK 2. **THE DIGESTION PROCESS (CHEMISTRY)**

OBJECTIVES

- Understand the basic chemistry of digestion.
- Explore the role of enzymes and acids in the digestion process.
- Investigate the effect of different foods on the digestive process.

MAIN QUESTIONS TO BE ANSWERED BY STUDENTS MAKING THIS PROJECT

- What are enzymes and how do they work in the digestive system?
- How acids in the stomach aid in digestion?
- How different types of food affect the digestive process?
- How can a balanced diet promote digestive health?

STUDENTS´ ORGANIZATION

Groups of 4.

TIME

3 sessions.

PROCESS

Session 1

Teacher presents the basic chemistry of digestion, including the role of enzymes and acids. The plastinated organs are used to better present the different parts of the digestive system and the digestive process.

Session 2

Students do research on how different food groups affect the digestive process. Each team works on one food category (fruit and vegetables, meat and poultry, fish and seafood, starchy food, dairy etc.)

Students will analyze their data and make conclusions about the effect of different types of food on the digestive process.

Session 3

Students present their findings to the class while using the plastinated organs to illustrate the role of enzymes and acids in the digestive process. In the end, the class discusses which food categories are better for a healthy digestive process.

RESOURCES

- Plastinated organs of the digestive system
- Computer with access to internet
- Textbooks

Video 1 Video 2 Video 3

ASSESSMENT & EVALUATION

Students will be evaluated based on the accuracy of their research and the clarity and effectiveness of their presentation.

TECHNOLOGY

*LEARNING UNIT 2: **INTEGRATING HEALTH AND TECHNOLOGY***

TASK 1. **DESIGN A NUTRITION TRACKING APP**

OBJECTIVES

- Understand the importance of nutrition tracking for maintaining a healthy lifestyle.
- Explore the role of technology in promoting healthy eating habits.
- Develop skills in user interface design and app development.
- Promote awareness of nutritional values and the impact of food choices on health.

MAIN QUESTIONS TO BE ANSWERED BY STUDENTS MAKING THIS PROJECT

- How can technology help individuals track their nutritional intake?
- What features and functionalities should be included in a nutrition tracking app?
- How can the app encourage and motivate users to make healthier food choices?

STUDENTS´ ORGANIZATION

Small groups of 3-4.

TIME

4 sessions.

PROCESS

Session 1

Teachers introduce the concept of nutrition tracking and its significance in maintaining a healthy diet. Open discussion in class about existing nutrition tracking apps and their features. Teacher instructs students to conduct research on recommended daily nutritional values and dietary guidelines. Encourage students to identify the key functionalities and features that should be included in their app.

Session 2

In session two teachers guide students in designing the user interface and user experience of their nutrition tracking app. Students need to consider visual representations of nutrition data, goal tracking, personalized recommendations, and user-friendly navigation. How the data provided in the app affect the health of the organs related in digestion such as stomach and intestines?

Session 3

Students are provided with resources and tools for prototyping the app's screens and interactions. They can use online platforms to do that.

Session 4

Students present their work. Teachers encourage a discussion where students can explain the reason behind their design choices and how their app promotes healthy eating habits. Also, how the things presented in the app affect specific organs such as the stomach and the small intestine. Students can use the plastinated organs for demonstration.

RESOURCES

- Research materials on nutrition guidelines and recommended daily nutritional values.
- Design software or online tools for creating app prototypes (e.g., Adobe XD, Sketch, InVision).
- Computers or mobile devices for app design and development.
- Plastinated organs for demonstration.

Video 1

Link

ASSESSMENT & EVALUATION

Students are assessed based on the creativity and functionality of the app design and their understanding of nutrition concepts and their integration into the app design.

TASK 2. **EXPLORING WEARABLE HEALTH TECHNOLOGY**

OBJECTIVES

- Understand the role of wearable health technology in promoting wellness and fitness.
- Explore various wearable devices and their functionalities in monitoring health and nutrition.
- Analyze the impact of wearable health technology on individuals' behavior and lifestyle choices.
- Foster critical thinking skills and ethical considerations related to wearable health technology.

MAIN QUESTIONS TO BE ANSWERED BY STUDENTS MAKING THIS PROJECT

- How do wearable health technologies monitor and track health and nutrition-related data?
- What are the potential benefits and limitations of using wearable devices for health and nutrition monitoring?
- How can wearable health technology influence individuals' behavior and lifestyle choices?
- What ethical considerations should be taken into account when using wearable health technology?

STUDENTS´ ORGANIZATION

Individually or small groups.

TIME

2 sessions.

PROCESS

Session 1

Introduce the concept of wearable health technology and its applications in health and nutrition.

Ask students to search different types of wearable devices (e.g. fitness trackers, smartwatches) and their functionalities. Focus on how these devices work and how the track health and nutrition related habits. What are the benefits of such technologies. What are the limitations and are there implications by using these?

Session 2

Students work in small groups to prepare a small presentation on the wearable device they chose. What are the main features and how these affect specific organs related to nutrition such as stomach and small/large intestine. Ask them to use plastinated organ for visual assistance when presenting their findings.

RESOURCES

- Internet access for research on wearable health technology
- Plastinated organs
- Computer access to prepare presentation

Info 1

Video

ASSESSMENT & EVALUATION

Students are assessed based on the depth and accuracy of the research and their ability to analyze using critical thinking. Also the presentation of the findings will be evaluated.

ENGINEERING

LEARNING UNIT 3: ***PROCEDURES AND MODELS RELATED TO THE DIGESTIVE SYSTEM***

TASK 1. **ENDOSCOPY IN THE DIGESTIVE SYSTEM**

OBJECTIVES

- Understand how endoscopy is used to examine the digestive system.
- Learn about the technological advancements in endoscopy.
- Connect endoscopy with the study of nutrition.

MAIN QUESTIONS TO BE ANSWERED BY STUDENTS MAKING THIS PROJECT

- What is endoscopy and how is it used to examine the digestive system?
- How has technology advanced in endoscopy and what are the benefits?
- How can endoscopy be used to study nutrition and the digestive system?

STUDENTS´ ORGANIZATION

Groups of 3-4.

TIME

2/3 sessions.

PROCESS

Session 1

Introduce endoscopy and its use in examining the digestive system. Connect endoscopy with the study of nutrition and the digestive system. Use plastinated organs such as the stomach to demonstrate how the endoscope is used to examine the inside part of it.

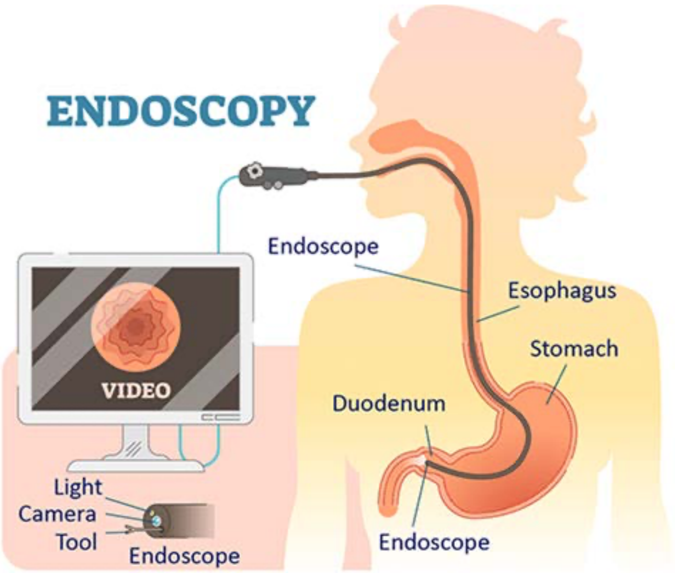
Session 2/3

Students do research on the different types of endoscopes and the technological advancements in endoscopy and their benefits. They create a presentation on the findings. They use plastinated organs and an endoscope to demonstrate how it works.

RESOURCES

- Plastinated organs such as the stomach and small intestine for visualization and hands-on learning.
- Endoscopy tool
- Educational videos on endoscopy and its use in medicine and nutrition
- Online articles and research papers on the topic

Video 1 Video 2 Video 3



Link

ASSESSMENT & EVALUATION

Students will be assessed on the accuracy of their research, the clarity and organization of their presentation, and their ability to connect endoscopy with the study of nutrition and the digestive system.

TASK 2. **PERISTALTIC MOTION MODEL**

OBJECTIVES

- Understand the mechanical principles behind peristalsis
- Understand its role in moving food through the digestive system.
- Find the design and engineering of a mechanical system that work with peristaltic motion like the intestines.
- Create a functional model that works with peristaltic movement.

MAIN QUESTIONS TO BE ANSWERED BY STUDENTS MAKING THIS PROJECT

- What is peristalsis, and how does it work in the digestive system?
- How can peristaltic motion replicated in engineering? What mechanical systems use peristaltic motion?
- What should we take into account when designing a peristaltic model?

STUDENTS´ ORGANIZATION

Groups of 2-3.

TIME

4 sessions.

PROCESS

Session 1

Introduce peristalsis. Provide an overview and its role in moving food through the digestive system. What is the mechanics of peristaltic waves and how muscle contractions support it? Use plastinated organs to demonstrate how does this take place.

Session 2

Students do research on the principles of peristalsis from both mechanical and anatomical perspectives. They can examine the palstinated intestines to get a better understanding of the anatomical structure and how muscles are arranged. Ask them to discuss in groups and find an idea for a mechanical system that uses peristaltic motion.

Session 3

Students will create a prototype of their system. They should consider carefully what needs will their system serve and how close will its function be in that of an intestine. Encourage them to work outside school to test and make improvements to their model.

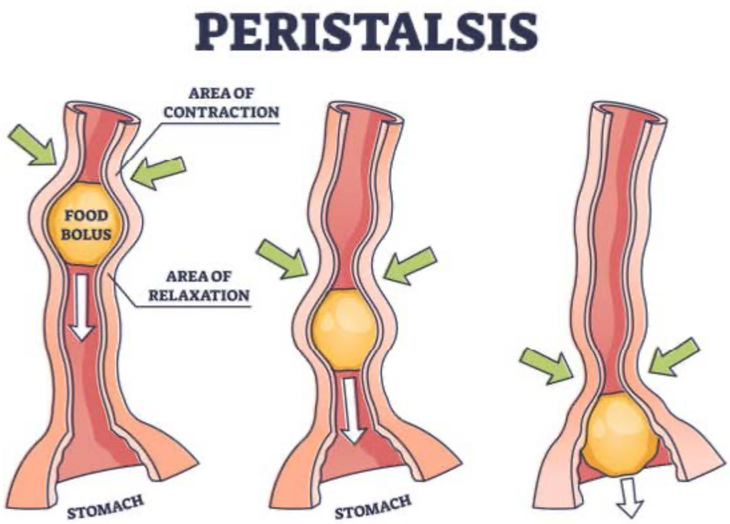
Session 4

Each group presents their model to the class. They need to explain the design, how they built it, what is its function and how it relates to the peristaltic motion of the intestine. Ask them to use the plastinated organ in comparison to their model in order to give the class a better understanding.

RESOURCES

- Plastinated organs (intestine).
- Educational material such as videos on peristaltic motion of the digestive system.
- Handcraft material to build the model.

Video 1 Video 2 Video 3



Link

ASSESSMENT & EVALUATION

Assessment will be based on the functionality and anatomical accuracy of the peristalsis model. Also, students will be assessed on their understanding of the topic as well as in the level of their presentation.

ARTS

*LEARNING UNIT 4: **DIETS THROUGH ART***

TASK 1. **HEALTHY AND UNHEALTH DIETS THROUGH ART**

OBJECTIVES

- Educate students on the importance of healthy eating habits and the impact of an unhealthy diet on the human body.
- Encourage students to express their knowledge on healthy and unhealthy diets through art.

MAIN QUESTIONS TO BE ANSWERED BY STUDENTS MAKING THIS PROJECT

- What is a healthy diet?
- What is an unhealthy diet?
- What are the effects of an unhealthy diet on the human body? Which organs are directly affected?
- How can we promote healthy eating habits through art?

STUDENTS´ ORGANIZATION

Groups of 2-3.

TIME

2-3 sessions.

PROCESS

Session 1

Students are introduced to the concept of healthy and unhealthy diets through a class discussion and presentation on the topic. Then, they research and gather information on healthy and unhealthy diets and their impact on the human body.

Session 2

Students express their knowledge on healthy and unhealthy diets through art. They can use any medium of their choice, such as painting, drawing, sculpture, or photography. For example, they take a photo of a healthy food, or draw about the consequences of unhealthy eating habits. They can use the plastinated stomach and intestines to demonstrate the direct consequences of an unhealthy diet. They can include the actual palstinated organs to get inspired in their artworks or even use them on it. They present their artwork to the class and explain their creative choices based on their research.

RESOURCES

- Websites such as ChooseMyPlate.gov, Eatright.org, and World Health Organization (WHO) for information on healthy and unhealthy diets.
- Art supplies such as paint, markers, paper, clay, or a camera.
- Plastinated organs

Pinterest

Link

Link

ASSESSMENT & EVALUATION

Students' work is evaluated based on their understanding of the topic, their creativity, and their ability to communicate their ideas effectively through art.

TASK 2. **FOOD PHOTOGRAPHY**

OBJECTIVES

- Develop understanding of healthy and unhealthy food choices.
- Develop skills in food photography.
- Explore the artistic expression of nutrition and health.

MAIN QUESTIONS TO BE ANSWERED BY STUDENTS MAKING THIS PROJECT

- What are the visual differences between healthy and unhealthy food choices?
- How can the composition of a photograph have a message about nutrition and health?
- How does the portrayal of food in the media impact our perceptions of healthy and unhealthy eating?

STUDENTS´ ORGANIZATION

Individual or in pairs.

TIME

4 sessions.

PROCESS

Session 1

The teacher introduces the topic of food photography and provides examples. Students research healthy and unhealthy food choices and consider how they can be photographed.

Session 2

Students plan their photographs, including the subject, composition, and location. Then they take the photographs trying to create as visually engaging images as possible. They can include plastinated organs such as the stomach in the photography to create a more surrealistic image.

Session 3

Students edit their photographs using digital software to enhance the colors and composition.

Session 4

Students present their photographs to the class explaining their choices and the message they are trying to give.

RESOURCES

- Cameras (can be students' smartphones)
- Digital editing software (such as Photoshop)
- Examples of food photography for inspiration
- Plastinated organs

Video 1 Video 2

Link Link

Link





ASSESSMENT & EVALUATION

It can be peer assessment, with students voting for the best artwork.

TASK 3. **NUTRITION IN POOR AND RICH COUNTRIES**

OBJECTIVES

- Educate students on the disparities in nutrition and food security between poor and rich countries.
- Encourage students to think critically about the causes and consequences of food insecurity.

MAIN QUESTIONS TO BE ANSWERED BY STUDENTS MAKING THIS PROJECT

- What is food insecurity, and how does it affect people in poor countries?
- What are the main causes of food insecurity in poor countries?
- How does it affect the health and wellbeing of people and communities in poor countries?
- How do food systems and policies contribute to global food insecurity?

STUDENTS´ ORGANIZATION

Groups of 4-5

TIME

3 sessions.

PROCESS

Session 1

Introduce the issue food insecurity and nutrition disparities in poor countries. Encourage a group discussion about the topic. Ask students' thoughts on it.

Session 2

Students do research and gather information on the causes and consequences of food insecurity in poor countries. They analyze the data from different countries (rich and poor) and make a comparative analysis.

Session 3

They present their findings and suggest potential solutions with their classmates.

RESOURCES

- Internet access to visit websites such as WHO and United Nations Development Programme (UNDP) for information.
- Data on food security and nutrition in different countries

Link 1 Link 2

Video 1 Video 2

ASSESSMENT & EVALUATION

Students' work will be evaluated based on their understanding of the topic. Also, how good they collected and analyzed the data and how reasonable were the solutions they suggested.

MATHEMATICS

LEARNING UNIT 5: ***NUTRITION AND MATHEMATICS***

TASK 1. **STOMACH AND NUTRITION BASIC MATHEMATIC**

OBJECTIVES

The objectives of this task are for students to be familiarized with basic concepts of nutrition and we-ll-being. They also will learn the mathematical formulas used by dietitians to calculate the humans Basic Metabolic Rate, Thermic Effect of Exercise and the calories in each macronutrient. Also, the students will be able to create a very simple and easy diet plan with the tools that they will learn from this task.

MAIN QUESTIONS TO BE ANSWERED BY STUDENTS MAKING THIS PROJECT

- How many calories do humans consume in a day for their bodies to work properly?
- How do humans' daily activities affect the amount of food they must eat?
- How many calories are in Carbohydrates, Proteins, Fats and Lipids?
- How is a balanced meal composed?
- What should be the largest meal of the day?
- How much should a human eat in each meal?

STUDENTS´ ORGANIZATION

Groups of 3-5.

TIME

3 sessions.

PROCESS

Session 1: BMR

Basic Metabolic Rate is the number of calories a person has to consume in a day in order for their body and organs to work properly. So, this is the number of calories needed in a day without taking into thought the calories burnt in exercises and activities. One of the mathematical formulas used for that calculation is designed by Mifflin (1990). The formula is slightly different for men and women:

BMR FOR MEN = 10 x Weight (kg) + 6.25 x Height (cm) – 5 x Age (years) + 5

BMR FOR WOMEN = 10 x Weight (kg) + 6.25 x Height (cm) – 5 x Age (years) -161

Students can calculate their BMR.

Thermic Effect of Exercise is a number that shows how many calories someone spends in a day depending on their style of living and activity. This number is easily calculated by the table below:

Type of lifestyle and activity	Kcal/day
Sedentary lifestyle (Sitting down, writing, cooking, slow walking, driving…)	0.2 x BMR
Light activity (Doing chores at home, lifting some light packages, fast walking…)	0.4 x BMR
Medium activity (Light dancing, running, biking, gardening, playing sports for fun…)	0.6 x BMR
Heavy activity (Hard manual work, intense sports, extensive daily workout…)	0.7 – 1.2 xBMR

Students can calculate their TEE.

Finally, students can calculate their Total Energy Expenditure for a day. This is the total amount of calories a person needs to consume throughout their day to be in mass equilibrium. It is calculated by:

Total Energy Expenditure = 1.1 x (BMR + TEE)

After finishing this task, if there is time left, students can think about their results and discuss them with their results with their classmates.

Session 2: Calories per day

Different macronutrients have different amounts of calories in one gram. One gram of Carbohydrates has 4 calories (kcal), one gram of Proteins has 4 calories (kcal), one gram of Fats has 7 calories (kcal) and one gram of alcohol has 9 calories (kcal).

It is usually assumed that the average adult human consumes around 2000 kcal daily. And in a common diet plan a human adult usually eats food with these proportions:

Carbohydrates are 50 %, Proteins are 30 % and Fats are 20 %.

Students can calculate how many grams of each macronutrient an average adult human should eat.

Also, they can calculate the same for themselves based on the results from the previous activity (using their total energy expenditure).

Session 3: Macronutrients per meal

It is usual and practical for a person to eat most of their daily calories at lunch. So, based on that we created a table with rough calculations on the proportions each meal has.

Students can use the table to calculate the calories of each meal for the average adult.

Moreover, they can use their results to calculate the gram of each macronutrient (Carbohydrates, Proteins, Fats if assumed the above proportions) every meal should have.

Breakfast - 30 % of daily calories

Lunch - 40 % of daily calories

Dinner - 20 % of daily calories

In-between snacks - 10 % of daily calories

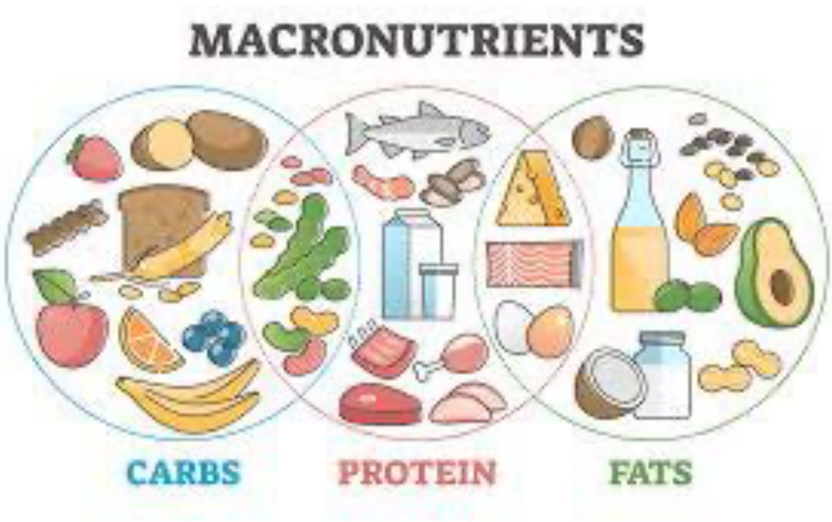
RESOURCES

- Plastinated organs
- Computer with access to the internet (Not necessarily)
- Paper sheets (For students to write down the information and do the calculations)
- Portable calculator (Not necessarily)

Video 1

Video 2

Info



Link

ASSESSMENT & EVALUATION

The evaluation will be done by the teacher based on the following criteria:

- If the students understand the basic mathematical principles better through the lesson
- If the students feel more educated and informed about their body, diet, mathematics, health
- The ability to use mathematical tools in everyday life
- The students' interpretation on the goal of this lesson and how they can come to a useful conclusion

TASK 2. **SMALL INTESTINE AND STATISTICS**

OBJECTIVES

The objectives of this task are for students to be familiarized with basic concepts of statistics and the anatomy of the small intestine. They also will learn the mathematical formulas used like volume, sample mean, median and sample standard variation. Also, the students will be able, given a sample of lengths of the small intestine, calculate some of the most useful statistics to understand the complexity of the human body.

MAIN QUESTIONS TO BE ANSWERED BY STUDENTS MAKING THIS PROJECT

- How long is the small intestine?
- What is the diameter?
- What is the total volume of the small intestine?
- What is the average length of a small intestine?
- How much do the lengths deviate from the average?

STUDENTS´ ORGANIZATION

Preferably in groups of 3-5.

TIME

2 sessions.

PROCESS

Session 1: Size of the small intestine

We can say for the purposes of this lesson that the small intestine is a cylinder folded to fit into the human body. Using a measuring tape students can measure the diameter and the length of the sub-parts of the small intestine. Then, using the formula of the volume for a cylinder students can roughly calculate the volume of the small intestine.

Volume of cylinder = Height • π • r2

Where π = pi = 3.1415…

Session 2: Statistics and small intestine

The human small intestine has various lengths and is different in each person. Usually, we say that the average length is 7m. So, in this task students have to calculate the average length from the measurements in the table. After that they can calculate the median value and the standard deviation.

5,82	6,17	7,11	7,51	8,4	6,39
6,52	7,52	5,71	6,97	7,35	6,46
8,02	6,05	6,64	6,53	7,16	7,18
7,18	6,36	6,97	7,41	7,81	5,84
7,81	6,7	7,8	8,11	6,57	5,15
4,35	7,26	6,75	6,22	7,51	7,55
5,78	6,76	7,83	5,55	6,91	6,08
7,69	7,25	6,18	6,82	6,78	7,06
7,27	6,85	6,47	5,92	7,45	6,38
7,21	6,76	5,81	9,1	6,79	8,3

Because the numbers above are a sample and not the population we have to use a slightly different formula for the standard deviation.

Mean = (Sum of values) / (number of values)

Median = The value value that seperates the lower half of the observations from the higher half of the observaions. If the number of observations is odd then the median is the number left in between.If the number of observations is even then the median is calculated by the sum of the two most in between numbers divided by two.

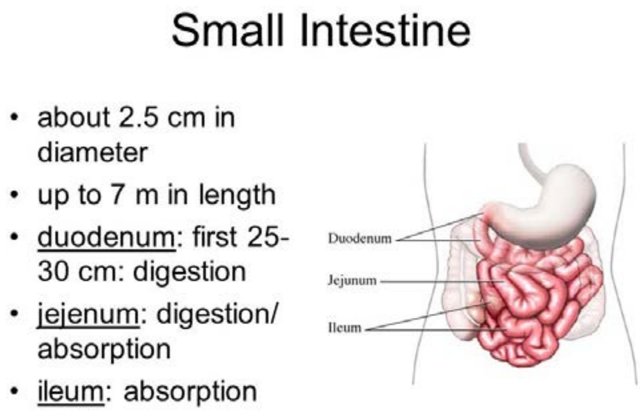
Sample standard deviation = Sqrt(sum (observation - mean)^2 / number of observations - 1).

Standard deviation is a measure of dispersion. This means that it shows how spread out the observations are around the mean. If the observations are spread widely around the mean then the standard deviation is large. If the observations are spread closely around the mean then the standard deviation is a small.

RESOURCES

- Organ Kit
- Computer with access to the internet (Not necessarily)
- Paper sheets (For students to write down the information and do the calculations)
- Portable calculator (Not necessarily)
- Measuring tape

Info



Link

ASSESSMENT & EVALUATION

The evaluation will be done by the teacher based on the following criteria:

- If the students understand the basic mathematical principles better through the lesson
- If the students feel more educated and informed about their body, diet, mathematics, health
- The ability to use mathematical tools in everyday life
- The students' interpretation on the goal of this lesson and how they can come to a useful conclusion

TASK 3. **SUPERMARKET BASIC ACCOUNTING**

OBJECTIVES

- Enable students to apply their knowledge of nutrition and health to real-life situations
- Develop skills in budgeting and economic decision- making
- The use of plastinated organs will help students gain a better understanding of the importance of nutrients in a healthy diet and the impact of unhealthy food choices on specific organs and bodily functions.

MAIN QUESTIONS TO BE ANSWERED BY STUDENTS MAKING THIS PROJECT

- How can we create a grocery list that includes healthy food options while staying within a limited budget?
- What is the cost difference between purchasing fresh fruits and vegetables versus processed and packaged foods?
- Is purchasing in bulk a cost-effective option?

STUDENTS´ ORGANIZATION

Groups of 3-4.

TIME

3 sessions.

PROCESS

Session 1

Introduce the task to students and provide the hypothetical scenario where they are in charge of purchasing groceries for a family of four with a limited budget.

Discuss the importance of healthy food choices and the impact of unhealthy food choices on the body.

Session 2

Students research online the prices of different foods and compare the cost of purchasing fresh fruits and vegetables versus processed and packaged foods. Students compare the cost of purchasing in bulk versus purchasing individual items. Students create a grocery list that includes healthy food options while staying within the budget.

Session 3

Students present their grocery list and explain how they made their choices based on nutritional value and cost. Students discuss how they plan to use the purchased items to create healthy meals for the family. Students reflect on the task and their learning experience.

RESOURCES

- Computer with access to the internet
- Paper sheets (For students to prepare the grocery list)

Info

Video

ASSESSMENT & EVALUATION

Students will be assessed based on the accuracy and completeness of their grocery list, their ability to explain their choices based on nutritional value and cost, and their reflection on the task and their learning experience.

TASK 4. COMPARISON OF INTESTINE IN MAMMALS

OBJECTIVES

- Understand the variation in the morphology and length of the large intestine in different mammalian species.
- Learn how the anatomical features of the large intestine can lead to different eating habits of various species.
- Extract some conclusion of how the length of large intestine impact the digestion process

MAIN QUESTIONS TO BE ANSWERED BY STUDENTS MAKING THIS PROJECT

- How does the morphology of the large intestine vary among different mammals?
- How is the length of the large intestine related to the nutritional habits of these species? Is there a pattern?
- How do the anatomical features of the large intestine influence the digestive processes and nutritional adaptations in mammals?
- Where does the human intestine stand between other mammals?

STUDENTS´ ORGANIZATION

Groups of 2-3.

TIME

4 sessions.

PROCESS

Session 1

Provide an overview of the digestive system and its components, with a focus on the role of the large intestine. Use the plastinated intestine for demonstration.

Session 2

Split the class in groups and ask each group to choose three mammals with different eating habits. For examples herbivores, carnivores, omnivores etc. Then the start the research of the anatomy with a focus on the structure and features of the large intestine. Students can use textbooks or online resources.

Session 3

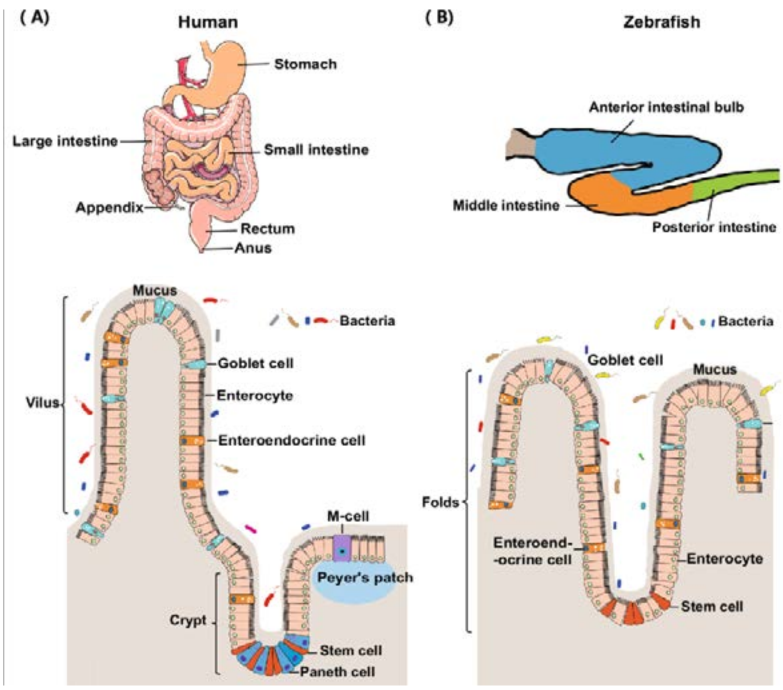
Students do research on the length of the large intestine and then on the nutritional habits of the selected species. Is there a connection between the size of the intestine and the amount of food they can consume? If so ask them to develop a formula. Is there a connection between the length and anatomy of the intestine and the nutritional habits of the species? Ask students to include human intestine in their research.

Session 4

The students present their finding and draw their conclusions. They should use the plastinated intestine for reference as they should compare each species with the human.

RESOURCES

- Plastinated organ
- Internet access or access to textbooks
- Paper sheets to keep track of their findings and make calculations



Link

ASSESSMENT & EVALUATION

Assessment will be based on the quality of research, the depth of analysis, the ability to draw solid conclusions and how good the presentation was.

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