



# ECO-PATROL

E-manual for non-formal environmental education  
second edition

**MURTER ECO-PATROL  
2017**



EDUKACIJSKI  
**CENTAR**  
ZA ODRŽIVU RAZVOJ  
OTOKA I PRIROBAJLA



AGENCIJA ZA  
MOBILNOST I  
PROGRAME EU



Erasmus+



## **ARGONAUTA ASSOCIATION**

### **European Volunteer Service "Sea is Life 6"**

Workshops Authors

Ivana Marin  
Massimiliano Arosio  
Viktoria Laner

Photography

Massimiliano Arosio

Booklet design  
and edition

Massimiliano Arosio  
Viktoria Laner

This project is funded by ERASMUS+

This publication has been produced with the assistance of the ERASMUS+ Programme of the European Union. The contents of this publication are the sole responsibility of ARGONAUTA and can in no way be taken to reflect the views of the European Union.



AGENCY FOR  
MOBILITY AND  
EU PROGRAMMES

# 1

# OUR NATURE

**TOPIC** Water

**LOCATION** Indoor, outdoor

**TIME** 3 hour

## MATERIALS & EQUIPMENT

Papers, pencils, calculator, mobile phone, 10 cards with names of food, tables of Average and Calculated Use, computer, projector, sound system, and materials for experiment.

## GOALS

To understand importance of water for all living beings, and the meaning of the phrase "no life without water". Learn how does the water cycle function and its importance in daily life. Present problems related with water scarcity and its excessive consumption and pollution. Encourage care for water quality, sustainable consumption, and future generations.

## SUMMARY OF THE WORKSHOP

Some 72 % of Earth is covered in water, but 97 % of that is salty ocean water and not suitable for drinking. Most of the freshwater, 70% is locked in ice caps and living beings can use less than 1% of actual amount. If we take in consideration that on our planet lives almost 8 billion people, it is not so much. One-third of the world's population lives in "water-stressed" countries, defined as a country's ratio of water consumption to water availability.

Countries labeled as moderate to high stress consume 20 percent more water than their available supply. Some spend a lot, without thinking, while others dyeing because of water scarcity. If we don't do something. next generations will face with the problem of water scarcity much worse than today. Water is the main resource of our life, without drinking it for more than 3 days we would die. Water is mandatory for all living beings and that's why it is necessary to protect it.

## USEFUL LINKS

presentation

<https://goo.gl/yj7wLq>

article

<https://www.earthrangers.com/wildwire/take-action/filtered-water-please/>

<https://www.livescience.com/29673-how-much-water-on-earth.html>





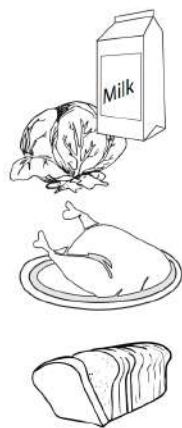
### Activity 1.

PowerPoint presentation about:

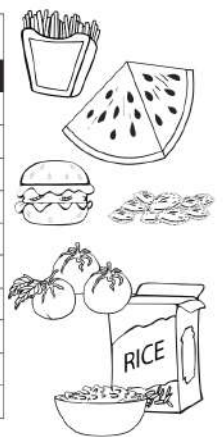
- importance of water,
- water scarcity,
- overconsumption,
- water pollution, and
- tips for saving water.

### Activity 2.

Cards with 10 types of food that we usually consume, are hidden in yard. After participants found all hidden cards, they need to put in order consumption of water that is needed to make just one serving of the foods we eat, from the one that needs the least to the one that needs the most.



<i>Water Needed to Produce a Single Serving</i>	
Name of Food	Amount of Water
Milk	65 gallons
French Fries	6 gallons
Lettuce	6 gallons
Watermelon	100 gallons
Chicken	408 gallons
Hamburger	1,300 gallons
Wheat Bread	15 gallons
Almonds	12 gallons
Tomatoes	3 gallons
Rice	36 gallons



It takes a lot of water to grow or produce the food we eat. All plants and animals need water. Plants and crops may get their water from the clouds in the form of rain. Other water may come from hoses, water troughs and irrigation systems.

Discuss about the fact that surprised them the most.

### Activity 3.

We experiences the world around with five senses: sight, hearing, taste, smell and touch.

Participants are divided in two group where each group need to take 5 funny pictures to show how we see, hear, taste, smell, and touch water. Each group should pick the winning picture of the other group



## Activity 4.

### How much do we spend

Participants should calculate usage of water per day at their home.

First group will calculate AVERAGE USE:

Write the number of times you and your family members do each activity in one day. Then multiply the number for Water Used by the Number of Times the activity is done. This will give you the number for the Gallons Used column.

Activity	Water Used	Number of Times	Gallons Used
Dishwasher	12 gallons per load		
Toilet Flushing	4 gallons per flush		
Bathing	45 gallons (full tub)		
Laundry	43 gallons per load		

Second group will calculate CALCULATED USE:

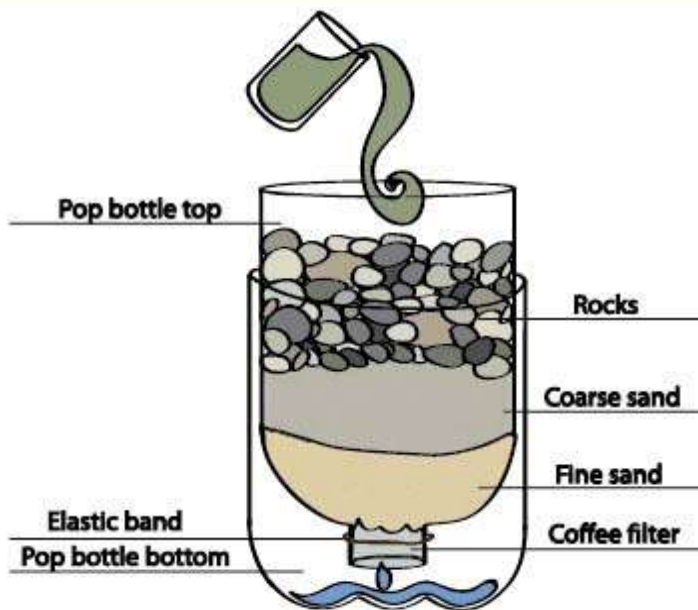
Record the number of total minutes used for each activity. Then multiply the number for Water Used with the number of Total Minutes to find the number for the Gallons Used column. For an activity you didn't do, place a 0 under Gallons Used. Add all the numbers under Gallons Used to find the Total Gallons Used.

Activity	Water Used	Total Minutes	Gallons Used
Garbage Disposal	4 gallons per minute		
Brushing Teeth	4 gallons per minute		
Washing Hands	4 gallons per minute		
Washing Dishes by Hand	4 gallons per minute		
Shower	4 gallons per minute		
Yard Watering by Hand	9 gallons per minute		

## Activity 5.

### Experiment - Filtered water

Most of the times when we open the water taps, we don't think what journey did the water pass. One of the most important steps in its journey is filtration, which uses layers to sift contaminants out of the water. Participants need to build their own simple filtration system from recycled plastic and natural materials.



## Activity 6.

For the conclusion of the workshop, participants are invited to solve the rebus that is related with the topic. In free translation it means: "When we are together, water can be saved",





# 2

# OUR NATURE

**TOPIC** World in jar

**LOCATION** Outdoor

**TIME** 2 hour

## MATERIALS & EQUIPMENT

Paper, pencils, old paper, bins, bags, jars, teaspoons, tweezers, gravel, active charcoal, soil, moss and other plants, water, decorative items (stones, shells, pinecone...).

## GOALS

Create a direct relationship between children and nature to understand the importance of plants and all other elements (soil, stones, water etc.) and their connection with humans. Link knowledge about water cycle with plants and their mutually relationship. Introduce children with scientific thinking by creating hypotheses based on learned.

## SUMMARY OF THE WORKSHOP

All living beings on earth need oxygen, and oxygen is created by plants in the photosynthesis process. To produce oxygen, for plants is necessary to have sun's heat and carbon dioxide. Also, for the growth of plants, minerals and nutrients from the soil and water are needed. All necessary for plants survival can be created in a closed system - jar. On that way you can build your own mini eco-system. Plants draw nutrients

from the soil, and with the help of sun and carbon dioxide, create oxygen. Moss and other plants maintains moisture and keeps the water evaporate, condensing, flushing and evaporating again. In a closed jar, it will create its own climate that will allow plants to achieve a uniform heat regime, and plants will not be exposed to changes in room temperature. The system is sustainable for a long period of time and it is possible for plants to live in it. Depending on the size and quality of eco-system it is possible to live for smaller animals that bear a warm and humid climate.

## USEFUL LINKS

articles

<http://photosynthesiseducation.com/photosynthesis-for-kids/>

<https://water.usgs.gov/edu/watercyclesummary.html>

<http://www.popularmechanics.com/home/lawn-garden/how-to/a9093/build-a-terrarium-in-6-steps-15574536/>





## Activity 1.

Participants are divided into 3 groups where one group need to collect gravel and stones, other plants and moss, and the third earth and natural decoration (pinecone, wood bark). It should be emphasized that the plants should to be small and picked from the roots.



## Activity 2.

Newspaper are spread over the working area with plants, moss, stones, soil, gravel, decorations and all material on it. First step is to imagine how we want that our mini eco-system looks like. Jar can be laid upright or horizontally and all elements in the layers need to be matched. Gravel is placed on the bottom of the jar for drainage of excess water. A thin layer of activated charcoal is filtering a small ecosystem and absorbing unpleasant smells. The soil layer is laid for plants where the ideal thickness is 7 to 10 cm, but it also depends on the size of the jar. Above that layer, moss should be placed over the whole surface, and plants planted with tweezers or knife. Decorative natural materials (stones, pinecone, shells, wood bark) can make a final touch in mini eco-system.



### Activity 3.

#### Scientific data

Participants should note parameters for keeping a scientific journal:

- owner of the mini ecosystem
- location
- Date
- number of plants / animals
- hypothesis

Together with participants, comment on what they think their mini eco-system might look like in a month and why - write down the hypotheses.



#### Remark:

When selecting plants, it is important to take plants that are compatible when it comes to the needs for light and humidity. It is better to choose young plants because their root is small enough to be easily placed in the ground. It is best to choose plants that like moisture and that grow slowly.

Plants inside the closed eco-system will evaporate the moisture, which will condense on the inner walls of the jar and sink into the ground. Because of this, it will be enough to water plants only every few weeks. If you notice that the interior of the jar is too cloudy (several drops are fine), open it and let the excess moisture get out.





# 3

# OUR NATURE

**TOPIC** SOS for bees

**LOCATION** Outdoor

**TIME** 3 hour

## MATERIALS & EQUIPMENT

3 flipchart with questions, pencils, questions for 3 group, 9 paper with dances and explanations, ball.

Beekeeper's equipment.

## GOALS

Learn about the importance of bees in human life and natural balance. Encourage participants to actively listen and keep the dialogue. To understand the structure of bees community and behavior through game. Awake interest for domestic products, traditional customs, and coexistence with nature.

## SUMMARY OF THE WORKSHOP

Albert Einstein said "If the bee disappeared off the surface of the globe then man would only have four years of life left. No more bees, no more pollination, no more plants, no more animals, no more man" and in two sentences explained importance of bees for man and nature. Main importance of bees in pollination, bees pollinate a third of everything we eat and play a vital role in sustaining the planet's ecosystems. They're also part of the earth's wonderful biodiversity and they contribute to maintenance of biodiversity of species.

Bees live in unique communities where they act as a well-organised superorganism. All members of the community, whether queen, worker or drone, are aiming for the same goal: ensuring the survival of the colony and its offspring. Bees could teach us so many things, from cooperation, organisation, behavior to building techniques, if we would only pay attention. Bees products such as honey, propolis, royal jelly are healthy and full of nutrient. Also use of beeswax is multiple, and it can be used in many fields. Importance of bees is unquestionable, and it's our mission to protect those small insects.

## USEFUL LINKS

questions

<https://goo.gl/yj7wLq>

article

<http://www.bee-careful.com/bee-life/bee-community/>





## Activity 1.

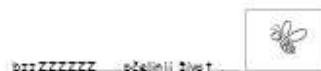
A local beekeeper tells a story about bee life, their role in nature, importance of those small insects, structure of their communities, bee products, hives etc. Participants are encouraged to actively listen a beekeeper so they can easily answer later tasks.

## Activity 2.

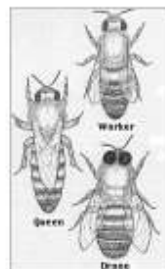
Participants are divided into 3 groups

- From Flower to Honey,
- Bee Job,
- Bee's Community

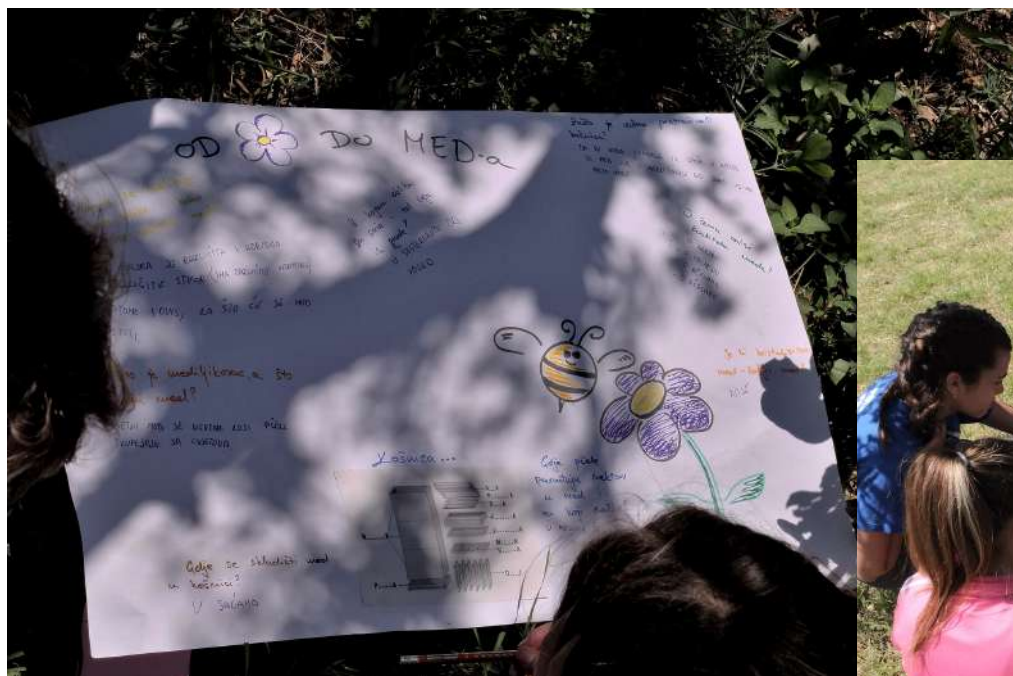
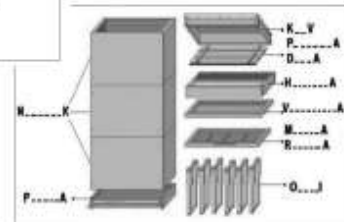
where each group gets a poster with questions, crossword puzzles or drawings that must be complemented. The team solves tasks while the local beekeeper goes from one to another group like bee. When the beekeeper comes to them they must act as small journalists and find out as much information as they need to solve the task.



Šta se čuje iz košnice? (What can be heard from the hive?)  
određeni pojmovi:  
- LIČINKA  
- ODRASLI STADIJ  
- JAJE  
- KUKU LICA



DIJELOVI I  
KOŠNICE



### Activity 3.

One person in the middle is the Queen, the other is the Bee-guard. The people in the circle have the ball, and throw it at the Queen. The Bee-guard may do anything to block the ball with his body: jump, squat, dive, etc. The ball may NEVER touch the Queen. If the ball touches the Queen at any time, the person who threw the ball (or the last person to touch it) then becomes the Bee-guard, the Bee-guard becomes the Queen, and the Queen goes back into the circle.

What makes this exciting is that from the moment the Queen is hit, the new Queen is vulnerable because the transition is instantaneous. The new Bee-guard must be fast at getting into the circle to defend him or her. This sometimes makes presidential turnover pretty quick, but it's exciting.

### Activity 4.

Bees have 9 types of dances by which they communicate with other members of the community. The box contains 9 papers on which are the names of dances with explanation. Each participant or couple (depending on the number of participants) need to explain the drawn dance by pantomime to the rest of the group. After the dance is guessed, actor need to read the meaning, and the one who guessed is the new actor.



circular dance  
cleaning dance  
dance of happiness



massage dance  
warning dance  
trembling dance  
shaking dance  
buzz dance  
swing dance



### Activity 5.

Dressing up the bee suit, learning its parts and visiting the bee hive from the safe distance.





4

# OUR NATURE

**TOPIC** New - old paper

**LOCATION** Indoor/Outdoor

**TIME** 3 hour

## MATERIALS & EQUIPMENT

Old paper, water, a wooden frame with net, a wooden frame, a container (bigger than frame), a container for mash, blender, sponge, dough roller or glass bottle, baking paper, plants/seeds for decoration.

## GOALS

Learn about the history of paper and its importance for civilization. Awake the importance of recycling, the problem of deforestation, and the contribution of the paper industry to total pollution. Develop creativity and desire for reusing & recycling. Conclude why recycling is necessary for preservation of environment and the planet we inhabit.

## SUMMARY OF THE WORKSHOP

Nearly 4 billion trees worldwide are cut down each year for paper, representing about 35 percent of all harvested trees. World consumption of paper has grown 400 percent in the last 40 years, and paper comes in many forms, besides what we can see around us. Apart from contributing deforestation which represents one of the largest issues in global land use, paper industry is the worst polluter to air, water and land of any industry. Each year

millions of pounds of highly toxic chemicals such as toluene, methanol, chlorine dioxide, hydrochloric acid and formaldehyde are released into the air and water from papermaking plants around the world. Recycling one ton of paper can save 17 trees, 7,000 gallons of water, 380 gallons of oil, 3.3 cubic yards of landfill space and 4,000 kilowatts of energy. These days Approximately 80 percent of U.S. paper mills use some recovered paper fiber to produce new paper and paperboard products. Even paper recycling does have limits and can be recycled up to 7 times, but doing that we are doing a lot in protection of our planet and quality of life.

## USEFUL LINKS

facts

<https://goo.gl/yj7wLq>

article

<http://www.ecology.com/2011/09/10/paper-chase/>

video

[https://www.youtube.com/watch?v=RR\\_218EtLJU](https://www.youtube.com/watch?v=RR_218EtLJU)





## Activity 1.

Participants are divided into four groups (Papyrus, Pergament, Paper in history, Paper today) and get the 15 facts about the history of paper. They must jointly find out which facts belong to which group, study them and present them to other groups.

To end activities discuss about:

- the importance of paper for civilization,
- the facts that surprised them/made them think
- deforestation
- the importance of paper recycling

## Activity 2.

Participants are invited to use collected paper for game, before recycling it. According to the instructions, participants need to make a paper airplanes of various sizes and shapes., and later make a competition to see which form of airplane is the most successful in the flight.

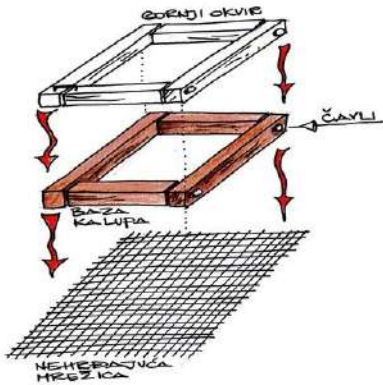




### Activity 3.

Recycled paper is really easy to make, and it can serve as decorative paper for postcards, boxes etc. Participants should make their own new-old paper in just few steps, and have a lot of fun doing it.

#### a) making the frame



#### b) making paper pulp



#### c) pulp on the frame



#### d) decoration



#### e) pulp on the blanket



#### f) squeezing water



#### g) drying & pressing



5

# OUR NATURE

**TOPIC** Healthy food

**LOCATION** Indoor

**TIME** 3 hour

## MATERIALS & EQUIPMENT

Parts of pyramid, explanations of floors, 30 cards with food name, sheets with diet related diseases, sheets with "5 healthy habits".

Ingredients for healthy burgers, salad, smoothie.

## GOALS

To learn what is meaning of healthy pyramid, and well-balanced diet. To learn new types of food, and healthy recipes. To become aware of diseases that are directly connected with diet. To learn some tips for healthy lifestyle. To see how healthy food can be tasty, easy to prepare, fun and great teambuilding activity..

## SUMMARY OF THE WORKSHOP

A nutritious, well-balanced diet - along with physical activity - is the foundation of good health. The nutrients in the foods support the activities of day-to-day living, influence on overall health, weight control and disease prevention. Fast lifestyle, no time for cooking, cheap and omnipresent junk food contrary to expensive fruit, vegetable, and eco-food are reasons why more and more

people have problems with overweight, obesity and health issues. More than 2.2 billion people are overweight or obese worldwide and obesity-related conditions include heart disease, stroke, type 2 diabetes and certain types of cancer. Importance of well-balanced diet and healthy lifestyle are unquestionable, that's why education play a vital role in helping to reduce obesity and to promote healthy lifestyle.

## USEFUL LINKS

materials

<https://goo.gl/yj7wLq>

article

<http://healthyeating.sfgate.com/eating-healthy-important-7166.html>

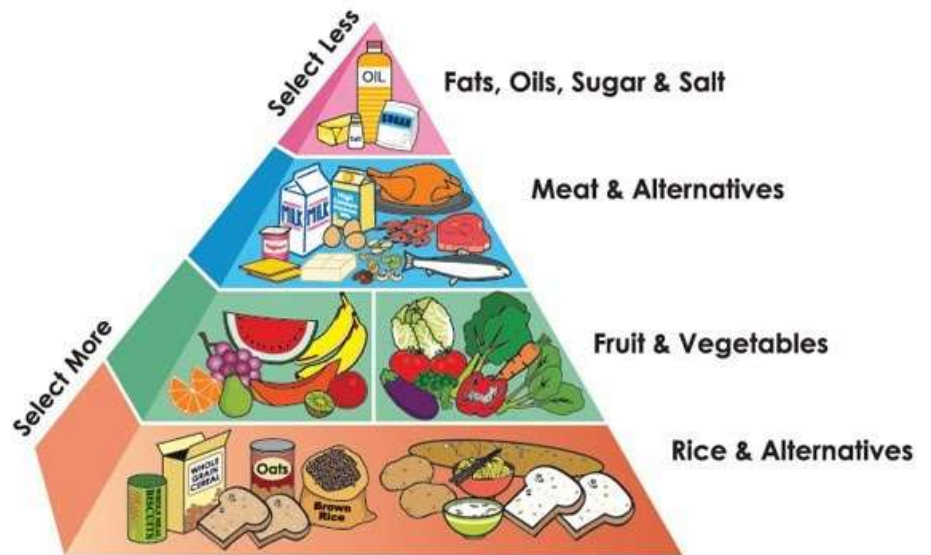






## Activity 1.

Participants need to build healthy pyramid from paper and link explanation for each floor of pyramid (e.g. connect "This floor is full of proteins, and you should eat it 2 times per day. It helps you to have good teeth, strong bones and muscles" with third floor).



## Activity 2.

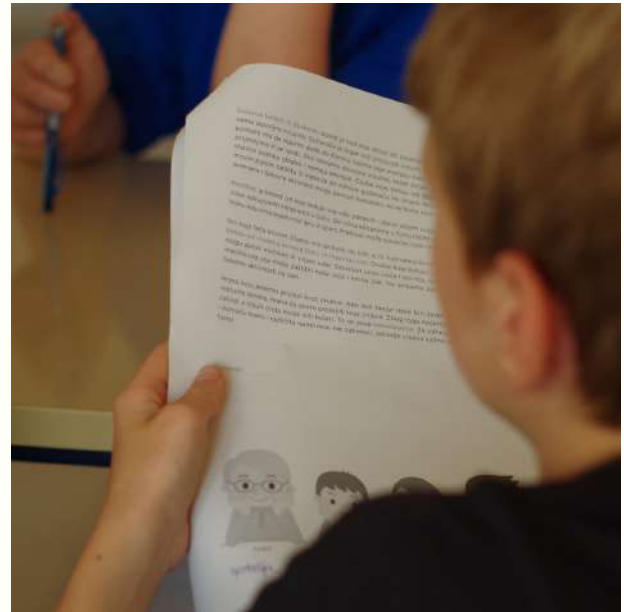
Participants need to put 30 types of food on the place they belong in the healthy pyramid.

Barley		Curd
Buckwheat		Cheese
rye		See Bream
Oats	Spinach	Shrimp
Millet	Watermelon	Steak
	Carrot	Beans
Strawberries	Leek	Lens
Avocado	Eggplant	
Plum		Cakes
Fig Tree		Chocolate
Coconut		Candy

### Activity 3.

Importance of healthy diet is also in prevention of disease caused by bad healthy habits. Participants need to read stories of Matko, Sandra, Ivan and Tin in order to connect them with disease (obesity, constipation, hypertension, diabetes).

Discuss about diet related diseases and how to prevent it.



### Activity 4.

Organize participants to prepare

- healthy burgers,
- smoothie and
- salad.

To wash, cut, and prepare ingredients, to have fun and work as a cooking team.



### Activity 5.

Share with participants  
"5 HEALTHY HABITS"

1. Don't skip the first meal
2. Eat fruits and vegetables
3. Drink water
4. Exercise
5. Sleep enough





"We need the contact with nature,  
the feel of wilderness,  
the exploration of the environment.

What we value today  
is what we will preserve tomorrow"



**This e-manual was created by Argonauta Association**

Association for Nature and Environment Conservation  
and Sustainable Development  
Pijaca Društva seoske izobraženosti bb  
HR - 22243 Murter  
Hrvatska  
Tel/fax: +385.(0)22.434.827  
mail@argonauta.hr