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# HOUSEHOLD ECOLOGY

## 1. TITLE OF THE MODULE:

**HOUSEHOLD ECOLOGY**
**(cleaning with detergents, saving and conservation of water, energy efficiency)**

## 2. BASIC DATA

**Motivation quote:**
”Remember that you are not the owner of the Earth! You are her protector and guardian!”- Part of the "14 commandments of Nature Friends".
**Target age**: 12-14 years
**Season**: it does not matter because the education will be implemented in classroom and school
**Duration**:

- Preparation: 45 minutes
- Activity: 3x45 minutes

**Competencies**:

- Communication in mother tongue
- Sciences
- Initiatives and entrepreneur competencies
- Aesthetics and arts

**Subjects:** chemistry, math/physics, classroom teaching...
**Key words:** environmental awareness, households, water, energy efficiency, primary waste selection, detergents, phosphates...

**Summary of activities**

| Number | Title | Method | Duration | Forms of work | Location |
|---|---|---|---|---|---|
| 1. Block<br>1. activity | Introduction to the topic of the module | Directed conversation with children | 5 minutes | big group (class) | indoor |
| 1. Block<br>2. activity | **Setting up 2 flip chart papers:**<br>1.flip chart: detergents and water conservation<br>2. flip chart: water savings and energy savings | Brainstorming<br>Discussion | 40 minutes | Smaller groups | indoor |
| 2. Block<br>1. activity | **Green laboratory**<br>Preparation of ecological detergents and cleansers | Guided conversation<br>Experiment, Research, Discussion | 20 minutes | Smaller groups | indoor |
| 2. Block<br>2. activity | **Drop by drop**<br>Measuring of water consumption - faulty tap | Experiment, Research, Measuring, Counting | 25 minutes | Smaller groups | indoor |
| 3. Block<br>1. activity | **Eco inspectors** | Research | 25 minutes | Smaller groups | indoor |
| 3. Block<br>2. activity | **Creating the posters for school lobby** | Creation, Group work | 20 minutes | Smaller groups | indoor |

## 3. OUTLINE OF THE MODULE

### Summary

The sustainable way of life in our households is one way for reducing pollution and for the preservation of our environment. This module will educate children about things they could do in their homes in order to contribute to environmental preservation, and the preservation of our planet.

Through discussions, laboratory experiments, research and games, module will be divided in 3 parts/blocks:

1. Introduction and collecting proposals for environmental preservation in our households through brainstorming and discussion (45 minutes)
2. Experimental part - Green laboratory, one group will prepare eco-detergents and the other one will measure water flow on faulty taps with aim to get amounts of spent water (45 minutes)
3. Research of energy efficiency and water savings in school (school eco – inspectors) and transfer of knowledge to school staff and pupils (45 minutes)

### Goals

Creating new attitudes and habits of children, so they can do activities in their homes that contribute to environmental protection (with aim of water conservation, conscious consumption of water, energy savings, using the primary waste selection...)

### Tools and materials

**For 1. and 3. Block of activities:**

Tools: Big papers/flip charts, post it notes, markers, glue, scissors, drawings from magazines, etc.

**For 2. Block of activities:**

**Tools and materials for preparation of ecological cleaning products**

Tools: grater, pot or other container, stove/hot plate, ladle, cup, plastic containers for detergent

Materials: washing soda (sodium carbonate), borax (sodium-borate), sodium bicarbonate and citric acid can be found in agricultural pharmacy, pharmacies, drug stores and larger supermarkets.

**Tools for calculation of water savings from the taps:**

Tools: stopwatch, measuring pot, calculator, pen and note needed for the calculation of water flow.

### Preparations

Depending on the block, copy the tables from the lists for pupils who will work on calculations of water consumption and tables for eco-inspectors. Prepare all tools and materials for experimental class. Prepare the hot plate and a pot for heating the raw materials. Prepare magazines with topics about energy efficiency, water conservation, etc.

### Arranging place

The module will be implemented indoor (classroom). The place should be arranged in a way that the tables are grouped for work in groups. For experimental block, the place should be arranged in a way to separate part for the hot plate. Recommendation is to use chemistry laboratory.

### Connection points

Although there are lots of children who take care of environment in their households, there are still very large number of these who, like their parents, do not pay attention and do not think about that. They often let water flow out of tap while they brush teeth or do some other activities, they do not turn the lights off, etc.
Our area rarely has real water shortage. Still, reduction of rainfall in summer, increase of precipitation in winter and drought are very noticeable in some areas. All the more important is to be aware and thrifty in

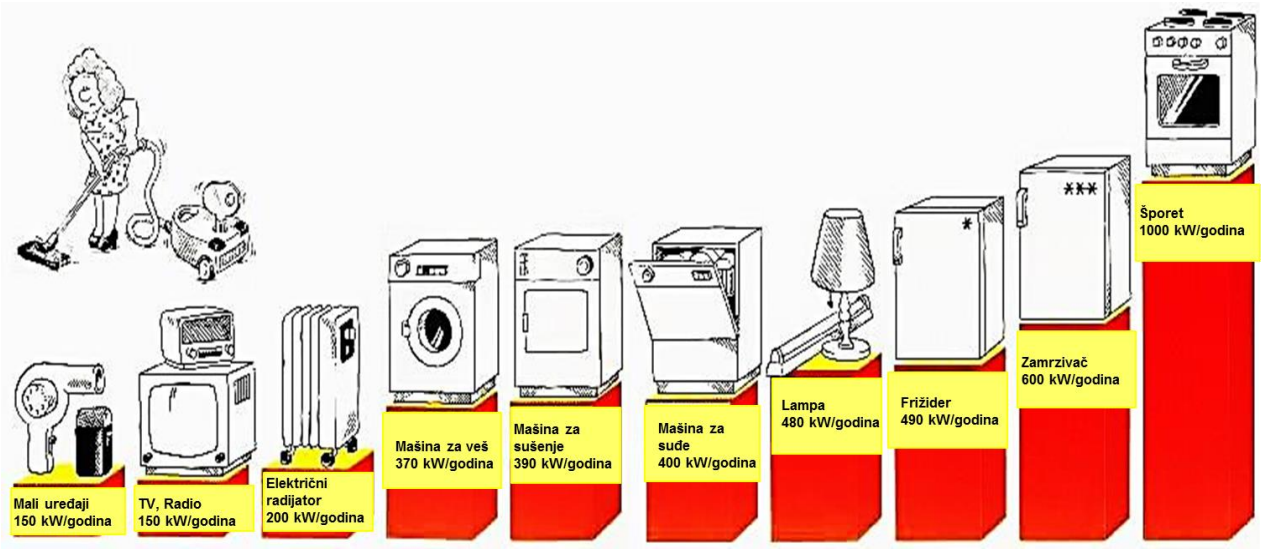
relation to water. Also, the use of various non-ecological cleansers and detergents with phosphates cause eutrophication of water surfaces and it can also kill fish and other aquatic animals.
Energy efficiency is very important because the excessive use of energy causes unnecessary atmosphere pollution, unnecessary exhausting of non-renewable energy sources, which finally creates unnecessary financial costs for consumers.

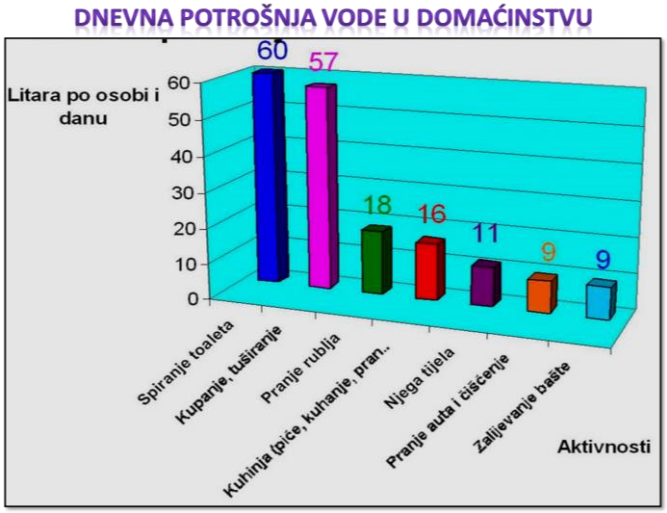
The module provides a great opportunity for thinking how to provide quality life conditions in our household, but with activities which will contribute to energy efficiency, saving and conservation of drinking water, etc. After realizing this module, the children will transfer gained knowledge and information to their parents and begin to apply what they learnt.

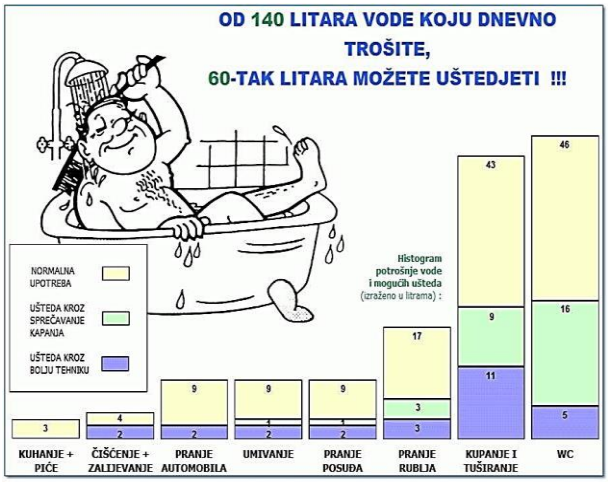
## Background and materials

One way for reducing pollution of our environment and for preservation, and also for financial savings in our households, is sustainable way of life in our households. Beside savings, we have to start thinking ecologically and to be aware that energy and water sources on our planet are not limitless.

Pictures bellow show relation of energy consumption of some household appliances, water consumption in a household and the ways for savings.



## IMPLEMENTATION

### 1. BLOCK OF ACTIVITIES (total 45 minuts)

### INTRODUCING THE SUBJECT MODULE AND COLLECTING PROPOSALS FOR ENVIRONMENTAL PRESERVATION IN OUR HOUSEHOLDS

**Introduction**
Motivation quote: “Remember that you are not the owner of the Earth! You are her protector and guardian!”- Part of the "14 commandments of Nature Friends".

After the quote as an introduction to the module "Ecology in the household", a brief will discuss the current environmental pollution.

**Collecting suggestions how to contribute to environmental preservation in our households (40 minuts)**

After the introduction, 2 empty flip chart papers will be set up with the following fields:
- detergents and water conservation
- water savings and energy savings

Divide into 2 groups and every group will work on one area (flip chart paper). On the post it notes they will write suggestions how to contribute to environmental preservation in households and post it on the flip chart paper. Then, they will present their suggestions and after that, through discussion, everyone could add what is missing.

These flip charts will be saved for the 3rd block of activities with pupils for creation of posters with the guidelines what can we all do in our homes to protect environment. The posters will be set up in the hallway, so the parents, pupils and other school visitors can see it.

### 2. BLOCK OF ACTIVITIES (total 45 minuts)

### GREEN LABORATORY – DOING EXPERIMENTS

Pupils will be divided into several smaller groups. One group will work on a preparation of ecological cleaning products and the other group will measure water consumption on faulty taps.

- **Ecological detergents and cleansers**
  At the chemistry class, prepare various ecological detergents for laundry, cleansers for toilets, products for removing the plaque, washing bathrooms. As introduction, the teacher will inform the pupils about various ecological cleansers which are good as the ones made in factory, but much healthier. After that, the children will select and prepare one ecological cleanser.
- **Drop by drop**
  One group of pupils will experimentally and also mathematically measure the water consumption on faulty taps. They will use the stopwatch and measuring beaker to measure water flow, when water leaks 1,2,3 drops per second and also when there is stronger flow. The water flow per minute will be measured experimentally, and after that, the amount of consumed water per day, month and year will be calculated.

### 3. BLOCK OF ACTIVITIES (total 45 minuts, or longer if necessary)

### CHECKING CONDITIONS IN SCHOOL AND TRANSFER OF KNOWLEDGE ON SCHOOL STAFF AND PUPILS

Pupils will be divided in groups. One group will be school eco-inspectors and the other group will create the posters which will be set up in a school hallway.

- **Eco-inspectors**
  Depending on the number of floors, the pupils will be divided in smaller groups and inspect the hallway, toilet, teacher's room, classrooms and other rooms to check the taps, flushers, light bulbs, unnecessary use of light, radiators, etc. After complete exam, the letter with information about

school condition and suggestions what should be fixed and replaced will be written for director, janitor and teachers. The letter with information could be also placed in the teacher's room.

- **Creating posters for the school hallway**
  Summarized suggestions with guidelines what can we all do in our homes to protect environment, which are got in the 1st block, will be written on posters. Also, the drawings, pictures and the recipes for all ecological detergents and cleansers will be posted on the poster.
  These posters will be posted in school hallway with aim to transfer the gained knowledge on all pupils in school, but also on the parents and other school visitors.

**Literature:**

Priručnik za edukaciju o životnoj sredini, Centar za životnu sredinu, Banja Luka, 2007.
Lijek za potrošače- skup modula ekološkog obrazovanja o održivoj potrošnji, Fondacija Magosfa, 2009.

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## STUDENT'S PAGE NO.1

**Table for calculation of the water loss due to drippings from faulty taps**

| Dripping water from the tap | The amount of water per minute (liters/min) | The amount of water per hour (liters/hour) | The amount of water per day (liters/day) | The amount of water per month (liters/month) | The amount of water per year (liters/year) |
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## STUDENT'S PAGE NO.2

**School eco-inspectors – Table for inspection of wet facilities and energy efficiency**

| Floor | Room | Wet facilities (tap, flusher) | Light bulbs, sockets and switches | Windows | Other notes |
|---|---|---|---|---|---|
| | | | | | |
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***NOTE:***

- ✓ When inspecting the wet facilities, every flusher and tap will be inspected to see if it works correctly, and if not, it will be written how big the water flow is (dripping, thin stream, big stream).
- ✓ The light bulbs will be inspected in every room in order to check whether there are some that do not work (how many of the light bulbs work, and how many do not)
- ✓ The windows will be inspected in every room in order to check whether somewhere the window glass is missing, can all the windows be closed, etc.
- ✓ Correctness of radiators and everything else the pupil find interesting can be added in other notes.

# TEACHERS PAGE
# ON PREPARATION OF ECOLOGICAL DETERGENTS AND CLEANSERS

## GREEN LABORATORY

Ecological detergent for washing laundry, laundry softener, detergent for hand dishwashing , cleaning product for toilets, products for removing plaque and fungi on ceramic, enamel and other surfaces, product for cleaning windows and other glass surface etc.

***ACCESSORIES****: grater, pot, stove / hot plate, ladle mixing cups, plastic container for detergent.*

***PURCHASE OF MATERIAL****: washing soda (sodium carbonate), borax (sodium borate), sodium bicarbonate and citric acid are available in agricultural pharmacies, pharmacies, drug stores and larger supermarkets.*

To produce your own, environmentally and health friendly cleanser is very simple. It takes only few of ingredients and a little time and effort.
These products not only that are better than most industrially produced products, but it will also not endanger your health or pollute the nature.

Natural cleaning products are based on natural soap, vinegar, lemon juice, glycerine, borax, baking soda, salt and essential oils. These ingredients are enough to make your home and laundry sparkling clean and fragrant.

### ECOLOGICAL DETERGENT FOR WASHING THE LAUNDRY

***Ingredients:***
7-10 liters of hot water
2 cups of grated soap (recommendation natural)
2 cups of baking soda
10 -20 drops of essential oil of: lavender, rosemary or citrus (lemon, orange, lime, tangerine).

Put the soap in a pot and add just enough water to cover the soap. Warm it all up and mix until the soap is completely melted. Pour the remaining water to this mixture, add baking soda and essential oil and mix it all together. Keep it in a cool and dry place, preferably closed. Shake detergent before use.
One cup is enough to wash a full washing machine of laundry.

### LAUNDRY SOFTENER

***Ingredients***:
100 g of sodium bicarbonate
600 ml of alcohol vinegar
700 ml of distilled water
Essential oil of your choice

Prepare a large pot of at least 4 liters, in which you can mix ingredients. Pour the baking soda in a pot and add 100 ml of water.
At this point you do not need to mix, but slowly start to pour vinegar. When you add the vinegar, mixture will start to boil, as it will come to a chemical reaction between vinegar and baking soda.

Let the mixture boil for few minutes, so soda can successfully melt. Then add the remaining water, which will stop the boiling. Only then start to mix to get a homogeneous liquid. At this point you can add essential oil. If your oils are bought in store, which are generally diluted, you can add 10-15 drops. If you have a pure essential oil, then five drops will be more than enough. Finally, choose the glass container with a lid in which you can put the finished product. Use this softener like any other – add about one cup when washing laundry.

**DETERGENTS FOR HAND DISHWASHING**

***Ingredients***:
100g of grated soap
1/2 cup of baking soda
1/4 cup of washing soda
1/2 tablespoon of citric acid
5 ml of essential oil of your choice: lavender, rosemary or citrus (lemon, orange, lime, tangerine)
1-1,5 liters of distilled water

Put the grated soap in a pot and add a little more than one cup of water. Heat the mixture on a stove and mix until soap is melted. Remove from heat, add the remaining ingredients and mix until you get homogeneous mixture. When the mixture is cooled, pour it in the appropriate container. Use the finished product like any other detergent for hand dishwashing. This environmentally friendly detergent does not give the foam like an industry does, but it is still highly efficient.

**CLEANING PRODUCT FOR TOILETS**

***Ingredients:***
100 g of borax
100 ml of alcohol vinegar or a little citric acid
500 ml of distilled water

To get the environmentally friendly and effective tool for cleaning the bathroom (toilet, descaling, destroying bacteria, etc), the borax, vinegar or tipped spoonful of citric acid, and half a liter of water are required. Mix ingredients well, put in a bottle with a sprayer and shake the content. To thoroughly clean the toilet, you need to spray it well and leave it to react for 15 to 20 minutes. After that, rub the toilet with a brush to remove any dirt.

**PRODUCTS FOR REMOVING PLAQUE AND FUNGI ON CERAMIC, ENAMEL AND OTHER SURFACES**

***Ingredients:***
250 ml of alcohol white vinegar
200 ml of distilled water
50 g of borax
50 ml of ethyl alcohol
10 ml of essential oil of eucalyptus, lavender, rosemary or citrus (lemon, orange, lime, tangerine).

Mix essential oil with alcohol. Heat the water to boil, remove from the heat source, add borax and stir. When a solution of borax is cooled, add alcohol with essential oil and vinegar. Mix well and put into a spray bottle. Shake the bottle before use.

Instructions: Clean the desired surface with this product, leave for 10 to 20 minutes. Wipe with a wet cloth. For areas with more plaque or fungi, repeat procedure 2-3 times.
The product is ideal for cleaning ceramic and enamel surfaces, chrome fittings in the bathroom, and it can also be used for glass and plastic surfaces in the bathroom.

**PRODUCT FOR CLEANING WINDOWS AND OTHER GLASS SURFACE**

***Ingredients***:
- 70 ml of alcohol vinegar
- 20 ml of alcohol
- 1 l of water

Mix all ingredients and put it in appropriate container (spray bottle). This product is recommended for cleaning rooms which are used by vulnerable people and asthmatics.