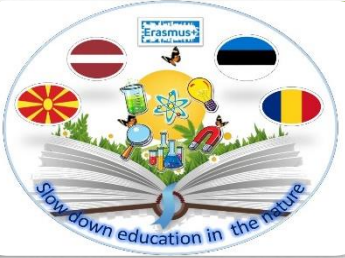


Good practice

Slow down education in the nature

Erasmus+ KA229 project





General information

- **School** – Palade Põhikool
- **Country** – Estonia
- **Subject** – Chemistry, Physics, Geography- density and its dependence on pressure and temperature. Natural phenomena due to air density. Ice and water densities.
- **Teachers** – Karin Poola, Anne Luukas



Chemistry is cool, part 2

- **Materials needed for each group:**
 - Clear container- preferably a tall transparent bottle. As alternative you may use drinking glass
 - 4-5 measuring cups
 - Dark (corn) syrup
 - Liquid dish washing soap
 - Water
 - Cooking oil
 - Rubbing alcohol (80%)
 - Food colouring- 2 difernt



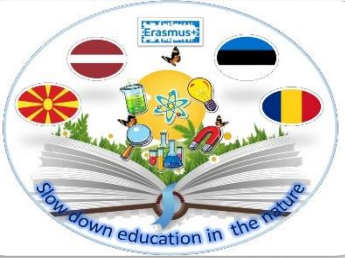
- **Surroundings**
 - school LAB
 - Classroom
 - Home



Stack Liquids

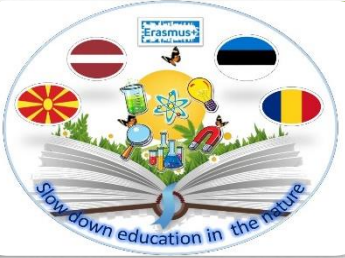
Aims

- increasing students science skills
- gaining knowledge about mixtures and separations
- gaining knowledge about density of substance
- handle all equipment and water carefully and responsibly
- work cooperatively with partners/group members
- make Chemistry more attractive subject
- Offer practical hands-on learning methods



Activity 1

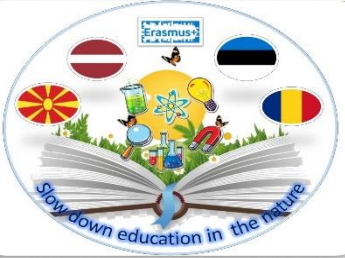
- Introduction by the teacher in the beginning of the lesson, safety instructions. Whole class discussion.
- Density is a physical quantity that indicates the mass of a substance per unit volume. The density symbol is ρ and SI is the unit in kg / m^3 or g / cm^3 . This is the International System of Units (Système International d'Unités)
- **The density of a substance generally depends on pressure and temperature. In the case of gaseous substances this dependence is very strong, in the case of solids rather weak (imperceptible to the eye), but in the case of liquids it is completely observable.**



Activity 2

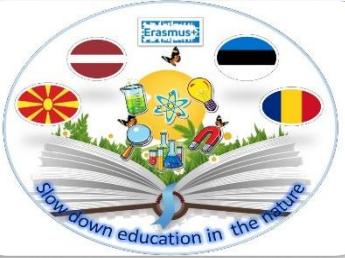
- Make small groups with 4-5 persons
- Prepare for every group all equipments described above
- Group members cooperate to stack different liquids – each group member should have a turn at adding one of the ingredients to glass or bottle





Activity 3

1. At first make clear how much liquid your bottle or drinking glass can carry: you have 5 different liquids, so you need to divide the container by 5 to determine how many milliliters of each liquid you will need.
2. Using measuring cups and measure out each liquid, if you don't have so many measuring cups then you may use also plastic cups as a containers for different liquids. It is important that the container where you will stack the liquids is transparent
3. Add food colouring to water and alcohol

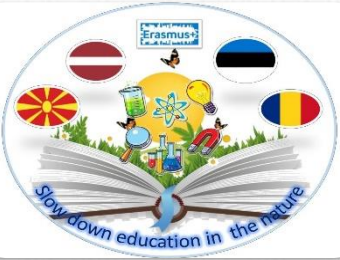


Activity 3

4. Now you start to pour liquids into the container- do it very slowly and carefully, one at the time: try to pour liquids along the glass wall
5. Start with syrup
6. Liquid dish washing soap
7. Dyed water
8. Cooking oil
9. Dyed alcohol

By adding water and alcohol the container must be tilted



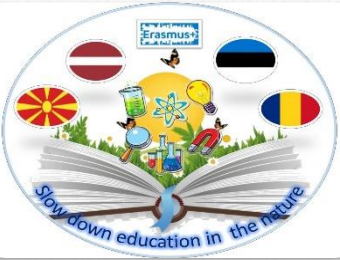


Activity 4

Observations and discussion:

- Each group make observations- they will predict:
 1. what will happen at each step
 2. will the oil and water mix?
 3. how will a drop of food colour behave in oil?
- A whole class have discussion about the theory of operation

ATTENTION! Dispose of used substances in accordance with local requirements!

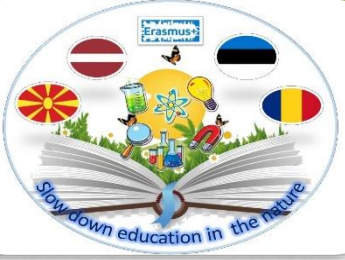


Activity 4

Observations and discussion:

- Each group make observations- they will predict: what will happen at each step
- If you do have a cap for the container then put the cap on tightly and **slowly, slowly turn the bottle upside down**. The arrangement should hold and the liquids will stack again in the same order.
- A whole class have discussion about the theory of operation

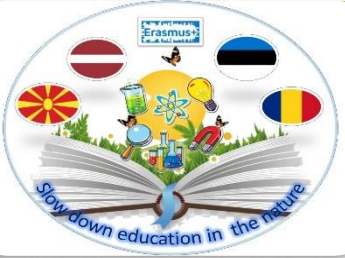
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Gallery



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