



**Dofinansowane przez
Unię Europejską**

Erasmus+ project "Developing selected competences of key students in lessons and in school extracurricular activities"

NR 2024-1-PL01-KA220-SCH-000247484/2

SCENARIO OF A DEMONSTRATION LESSON CARRIED OUT AS PART OF THE ERASMUS+ PROJECT

SUBJECT: Chemistry

CLASS: 8

LEAD TIME: 45 min

TEACHER: Wioletta Balewicz

SCHOOL NAME: J. Korczak Primary School No. 2 in Węgorzewo

LESSON TOPIC: Percentage concentrations of solutions.

General objectives

1. Developing the ability to apply chemical knowledge to explain phenomena in the surrounding world.
2. Shaping computational skills related to percentages in the context of chemistry.
3. Developing teamwork and experimentation skills.

Specific objectives (teaching content - specific requirements):

Pupil:

1. It explains what the percentage concentration of a solution is;
2. Calculates the percentage concentration of simple solutions;
3. Prepares a solution with a specified percentage concentration;
4. Analyses the effect of the addition of a substance or solvent on the change in concentration Solution;
5. Reads the concentration information of the substance from the product labels.

Key competences developed in the lesson:

Competence	Description of the project
Communicating in your mother tongue	Presenting the results of the group's work, describing phenomena and drawing conclusions.
Mathematical competences and basic scientific and technical competences	Performing percentage calculations, conducting a chemical experiment.
Learning ability	Solving practical problems, drawing conclusions from the experiment.
Social and civic competences	Teamwork, task sharing, discussion and group collaboration.
Cultural awareness and expression	A clear and correct form of presenting the results of work.
Initiative and entrepreneurship	Organization of group work, decision-making, experiment planning.
Digital competences (optional)	You can add an item to search for information about products online or to make a presentation.

Lesson objectives in the student's language (for the board):

After the lesson:

1. You will know what the percentages on product packaging mean.
2. You will be able to calculate the percentage concentration of the solution.
3. You will be able to prepare a salt solution of a certain concentration.
4. You will understand how the concentration changes when salt or water is added.

Working methods:

1. Work in groups,
2. Student experiment method,
3. Guided discussion,
4. Talk,

5. Chemical calculations (practical exercises).

Teaching aids:

1. Different packaging of everyday products with concentration information (e.g. hydrogen peroxide, beverages, disinfectants, cleaning products, food)
2. Kitchen or laboratory scales
3. Plastic beakers/containers
4. Table salt
5. Water
6. Measuring cups or cylinders
7. Worksheets with space for calculations
8. Calculators

Course of the lesson:

1. Introductory phase (10 minutes)

Teacher's activities:

1. Welcoming students.
2. Write down the lesson topic.
3. Conducting a short introductory interview:
"Is it **Have you ever wondered what the inscription '3%' on the the hydrogen peroxide label or '30 % on the cream packaging?'**"
4. Presentation of lesson objectives in the student's language (on the board).
5. A reminder of the concept **of the percentage concentration of a solution** – a brief explanation:

The percentage concentration of a solution is the number of grams of solute in 100 g of solution. (reminder of the concept of solution)

Representation of the formula for percentage concentration: $C_p = \frac{m_s}{m_r} * 100\%$

Student activities:

1. They actively participate in the conversation.
2. They write down the topic and objectives of the lesson.

2. Implementation phase (25-30 minutes)

Step 1: Working in groups – analysis of products from labels (5 min)

Students are divided into groups of 4. They receive packaging products with percentage markings. They write them down in the worksheet and mark the percentages given.

Step 2: Creating a brine of a certain concentration (10 min)

Each group receives salt, water, scales, a calculator, a beaker and a worksheet on which they present the solutions to 3 tasks and conclusions from the content.

3. Summing up phase (5-10 minutes)

Joint discussion and conclusions:

Questions for students:

- What happened when we added salt? (→ concentration increased)
- What happened when we added water? (→ concentration decreased)
- How to interpret "5%" on product packaging?

Applications for the board:

- **The addition of the substance increases the concentration.**
- **The addition of water reduces the concentration.**
- **The percentage concentration tells you how many grams of a substance are in 100 g Solution.**

Notes for the teacher:

- Prepare product packaging with labels in advance containing percentages.
- The lesson can be continued in the next lesson if the students do not they will have time to do all the calculations.

Bibliography:

Chemistry textbook for the seventh grade of primary school "Chemistry of the New Era" Jan Kulawik, Teresa Kulawik, Maria Litwin
The core curriculum in chemistry.

WORKSHEET – PERCENTAGE CONCENTRATIONS OF SOLUTIONS

Group member names:

.....

Class:.....

You have received product packaging with percentage markings. Write them down and write down what the percentages mean. – e.g. "3% hydrogen peroxide contains 3 g of hydrogen peroxide in 100 g of solution".

Name	Prod	Percentage Given	What does it mean (in words)
uct			

Task No. 1

Statement:

Pour 80 grams of water **into a beaker** and then **weigh 20 grams of salt**. Add salt to the water and stir thoroughly with a baguette until completely dissolved. Calculate the percentage concentration of the solution.

Reminder!!! $C_p = \frac{m_s}{m_r} \cdot 100\%$

Calculations for task 1:

Data:

.....

Search:

.....

Solution:

.....
.....
.....

Answer:

.....

Task No. 2

Statement:

Add 10 grams of salt **to the solution obtained earlier** and mix.
Calculate the percentage concentration of the solution.

Calculations for task 2:

Data:

.....

Search:

.....

Solution:

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Answer:

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Request:

✓ Adding a substance (salt) to a solution
(increases/decreases) its percentage concentration.

Task No. 3

Statement:

Add 70 grams of water **to the solution obtained earlier** and mix. Calculate the percentage concentration of the solution.

Calculations for task 3:

Data:

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Search:

.....

Solution:

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.....

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Answer:

.....

Request:

✓ Adding a solvent (water) to a solution (increases/decreases) its percentage concentration.

Teacher-methodologist's opinion on the lesson plan:

Overall Rating:

The lesson scenario has been prepared in a **well-thought-out, methodologically correct manner and in accordance with the core curriculum of general education for primary school**. The classes combine **elements of theory and practice**, develop **students' key competencies** and allow for activation through **group work and student experimentation**.

1. Implementation of the core curriculum:

The topic of the lesson and the planned activities fully implement the content specified in the core curriculum in chemistry for grade 7 – especially in

terms of knowledge of solutions and the calculation of their concentrations
Interest rates.

2. Activating teaching methods:

In this scenario used effective activating methods, such as teamwork, student experiment, talk, problem solving and presentation of results in the classroom.

3. High didactic value:

Students have the opportunity to go through the process of learning from observation and actions to draw independent conclusions. The next stages of the class lead students to a deeper understanding of the relationship between the mass of a substance, the mass of the solution and its concentration.

4. Development of key competences:

The scenario directly refers to the development of such competencies as: mathematical, scientific, learning, group cooperation and communication skills. This fits perfectly into the modern approach to teaching.

5. Card work as a tool supporting the didactic process:

Card work has been carefully planned. It contains clear instructions, room for calculations, answers and reflection. It supports the student step by step in solving practical problems, and at the same time enables formative assessment and self-assessment.

Ewa Szarmacher, M.A. - certified teacher at Primary School No. 1 in Węgorzewo
(teacher of biology, chemistry, physics)

APPROVAL BY THE SCHOOL PRINCIPAL

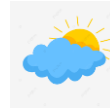
The script has received a positive opinion in terms of content and methodology – I approve it for implementation.

When leaving the class, mark your opinion about the lesson by placing an "X" under one of the drawings.

If you think you've learned a lot and enjoyed the lesson.



If you are not completely satisfied with the lesson.



If you think you haven't learned anything and you didn't like the lesson

