

ERASMUS+ PROJECT

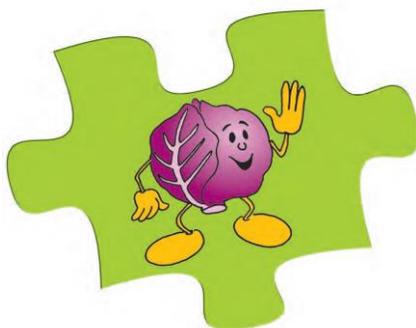
Learning
with the
Arts



SCIENCE MODULE: ACIDS & BASES

(See more information, videos and photos in the following link):

<http://learningwiththeartsgreece.weebly.com>



Subject : Chemistry

Topic: Bases and Acids

Age of students: 11-12

No of students: 25

Required prior knowledge

The procedure of an experiment, testing, observing and drawing conclusions

Objectives

At the end of the module the students will be able to know

- how an indicator is created and
- how we classify the chemical compounds into acids and bases according to the indicator

Opportunities

Ss also learn how to

- follow instructions and create long chunks of language (short poems/rhymes) in English, focusing on the newly learnt material (English class)
- compose short poems/rhymes with the help of their music teacher (Music class)
- further practise their imagination by creating various shapes using materials that were also used in the experiments (Art class)

Resources/materials/equipment

- Student's book and workbook
- red cabbage
- vinegar
- Water with detergent
- Orange juice
- Water with ammonia
- Water with baking soda
- Lemon juice

- teaspoon
- paper-paintbrushes
- musical instruments

Time frame

Chemistry lesson: 2 teaching hours (around 90 min)

Art : 1 teaching hour of 45-50 min

English: 1 teaching hour of 45-50 min

Music: 1 teaching hour of 45-50 min

Methods of work :

Chemistry/English: group work

Art/Music: Individual & group work

1. CHEMISTRY CLASS

Procedure / steps

Initially, they made an indicator by mixing red cabbage with clean alcohol and they found out that, when it is mixed with acid, it turns into red, while when it is mixed with a base it becomes green.

During the experimental process the groups cooperated, hypothesized, observed, got puzzled, discussed and finally came to conclusions experientially.

1ST EXPERIMENT

(In the first experiment students prepare a red cabbage indicator, which they will use in the subsequent experiments to detect acids and bases).

-We cut half a cabbage in very small pieces (chop it), and give each group enough quantity to fill a water glass up to the middle.

-Students place the small pieces of cabbage in a glass, add pure alcohol and mix well with a teaspoon. Then they filter the alcohol with the red cabbage, using a strainer.

-We explain that the liquid they have prepared is an indicator. We ask students to keep the indicator in a bottle that closes firmly with a lid, because they will need it later in the next experiments.

In order for the students to discover that the indicator changes color when mixed with an acid or a base, they pour a small amount of indicator into a clean glass and add lemon juice.

2ND EXPERIMENT

In this experiment, students use the indicator to detect acids and bases.

-Students write down the names of the substances they are going to examine and stick the papers onto the glasses.

-Then they pour the various substances in the glasses. We make sure students use handwashing detergent.

-It is also good to dissolve ammonia in water, pouring two or three drops of ammonia in a full glass of water, and give the pupils a small amount of the diluted solution.

-Students put a small amount of indicator in a glass and pour a few drops of vinegar into it, using a straw or dropper, which can be purchased from a pharmacy.

If pupils use a straw, they work as follows:

-They sink the straw into the glass with the vinegar and, while one end is in the vinegar, they close the opening at the other end with their finger. Then they place the straw over the glass with the indicator and remove their finger a bit, so that the vinegar pours into the glass drop by drop.

-Then, after rinsing the glass with the indicator and the straw or dropper, they repeat the experiment by examining the other substances.

-After the students have completed the experiment, they mark in the second column of their table the color the indicator takes each time. They fill in the other two columns of the table, dividing the substances they examined in two categories, depending on the color the indicator takes, on acids and bases.

2. ENGLISH CLASS

In the next stage, during the English lesson, the pupils were familiarized with all the taught notions and learned how to give instructions, concentrating on the above mentioned experiments.

They then were challenged to create poems/rhymes in English. In order not to exclude those (very few) who have some difficulties in using accurately & appropriately the target language, we encouraged them to come up with poems in the mother tongue and then, with the help of the whole class, we rendered them in the English language. All kids were willingly involved in the process, eagerly offering their 'option', while the teacher was providing feedback, explaining which one was accurate and appropriate and why.

LANGUAGE PRODUCED:

1st EXPERIMENT

Instructions

- Cut the cabbage into small pieces (chop the cabbage).
- Put them in a glass and pour some pure alcohol (up to the middle of the glass).
- Stir well with a teaspoon. The liquid you have prepared is an indicator.
- Strain the indicator and store it in the glass container, because you will need it in the next experiment.
- Pour a little quantity of the indicator in a glass and add a few drops of lemon.

What do you notice?

2ND EXPERIMENT

Instructions

- Pour a little vinegar in a glass and stick a small piece of paper onto it.
- Write on the paper the liquid that the glass contains.
- Pour a bit of the indicator, you prepared in the previous experiment, in another glass.
- Using a straw add a few drops of vinegar into the glass with the indicator.
- Repeat using: water with detergent, orange juice, water with ammonia, water with baking soda, and lemon juice. Use a different straw for each liquid. Can you divide the fluids into two groups according to your observation?

3. ART LESSON (Conducted in both languages)

See our video below here

https://www.youtube.com/watch?time_continue=36&v=1O7r3VICzfY

During the art lesson both teachers were present (art & teacher of English). The lesson was mainly conducted in English. The instructions were given in English and pupils found no difficulty in following them faithfully & appropriately.

The pupils were challenged to make Xmas cards on an 'indicator paper' (purple) using, different kinds of liquids (soda, milk, vinegar, water, etc.) -instead of markers or other colouring material- immediately on the indicator paper.

4. MUSIC LESSON

As soon as the poems were ready, the music teacher asked the pupils to choose the ones they liked most in order to compose them.

POEMS/RHYMES PRODUCED BY OUR Ss IN ENGLISH

1. We can use a base
in the first phase
We can use an acid
and that is the basic

2. The main ingredient is the indicator
that's why it's called 'dictator'!

Acids and bases,

experiments? A lot!

Come, observe, discuss...it's so hot!

3. Chemical reactions

Oh, they're so nice!

Do you think they are hard?

Oh, no they aren't!

Come and see, come!

4. I think you'd like

the acids and bases to study!

'cause, bear in mind!

If you don't

you'd better say, "Oh help me God!"

5. The indicator will turn red

the acid if it meets,

The indicator will turn blueish

the base if it sees!

6. The acids and the bases

you want to calm down,

because if this doesn't happen

Oh, God, how much ado!

7. Acids and Bases, experiments a lot!

Will explode...

Chemical reactions?

What's best?

Difficult you think?

Don't you worry about it!

8. The acids and the bases

you want to calm down,

because if this doesn't happen

Oh, God

how much ado!

9. Acids and Bases, experiments a lot!

Will explode...

Chemical reactions?

What's best?

Difficult you think?

Don't worry about it!

10. The indicator will turn red

the acid if it meets,

The indicator will turn blueish

the base if it sees!

Evaluation /comments

The 6th graders, in the frame of our Erasmus+project “Learning with the arts”, were familiarized with the notions ‘indicator, acids & bases’.

During the experimental process the groups cooperated, hypothesized, observed, got puzzled, discussed and finally came to conclusions experientially. They were all eagerly involved as they enjoyed the idea of experimenting by themselves.

Through experiential learning and the processing of the new knowledge, they consolidated how various substances are classified in Chemistry according to their properties.

Adding Art, English & Music to the learning process, did help them towards more solid consolidation, as the post- test demonstrated.

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