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ERASMUS+ PROJECT: "Development of selected key competences of pupils in lessons and extracurricular activities at school" No. 2024-1-PL01-KA220-SCH-000247484/2

Lesson plan

Basic information:

Subject: Chemistry

Class: 9

Time allocation: 45 minutes

Teacher: Mgr. Martin Kučera

School name: Primary School with MS Smolenice

Topic: Hydrocarbon derivatives

Subject: Chemistry; Class: 9; Topic: Hydrocarbon derivatives

Educational objectives:

Lesson objectives: Hydrocarbon derivatives, hydrocarbon residue, functional group

The pupil

- learns about hydrocarbon derivatives, hydrocarbon residues and characteristic groups.
- classify hydrocarbon derivatives and understand the relationship between structure and chemical properties.
- learn to write the chemical formula of derivatives.
- can name the importance of hydrocarbon derivatives in everyday life.

Content standard:

Hydrocarbon derivatives, hydrocarbon residues, characteristic groups

Performance standard:

- Identify the type of hydrocarbon based on its formula or name.
- Write down and use the general classification of hydrocarbon derivatives into groups.
- Write down the reaction product in simple chemical reactions of hydrocarbons and functional groups.
- Identify and name hydrocarbon derivatives.
- Solve simple problems involving chemical reactions of hydrocarbon derivatives and determine their products.

SMART goals for students

- Name compounds that are hydrocarbon derivatives.
- Divide hydrocarbon derivatives into individual groups of derivatives.
- Explain the importance of derivatives in industry.

Key competences:

Competencies	How they are fulfilled in class
Communication and working with information	The student knows how to use the information obtained, completes the assignment, and participates in the discussion
Digital	Use of interactive whiteboard, presentation projection
Personal and social	Discussion
Learning competence	Experimental learning methods
Entrepreneurial	Is aware of the benefits and possibilities of using hydrocarbon derivatives for life and the economy.

Teaching methods:

Methods: Discussion, experimental part – demonstration experiment, formative assessment, explanation

Forms: frontal, in pairs, individual

Teaching aids: Textbook, interactive whiteboard, chemistry table

Chemicals: vinegar, alcohol, sodium bicarbonate solution

Laboratory equipment: evaporation dish, beakers, spoons, matches

Differentiated tasks: Working with a teaching assistant

Lesson plan:

Introduction / Motivation (introducing the topic, question, problem, story, picture)

Introduction (3 minutes)

Welcoming the pupils

Introduction to the topic – general characteristics

Lesson title: hydrocarbon derivatives

Familiarise pupils with the aim of the lesson.

Exposition (new material) – explanation, discovery, working with text, investigation

Explanation: Explain the concept of hydrocarbon derivatives (22 minutes)

Hydrocarbon residue

Functional group

Classification of functional groups

Halogen derivatives

Oxygen derivatives

Experiment (demonstration experiment) (15 minutes)

Flammability – flammability of alcohol

Neutralisation reaction – diluted acetic acid with sodium bicarbonate

Fixation – exercises, application of knowledge in tasks, group work

Summary (5 minutes)

What are hydrocarbon derivatives?

Where can we encounter hydrocarbon derivatives?

Where are hydrocarbon derivatives used in everyday life?

Worksheet.

Homework: find uses for various hydrocarbon derivatives.

E.g. freons – refrigerant in refrigerators, propellant in sprays ...

Reflection and conclusion – summary, feedback, questions about what the pupils have learnt

Self-assessment and evaluation – short statements by students ("Today I learned..." / "What interested me most was...")

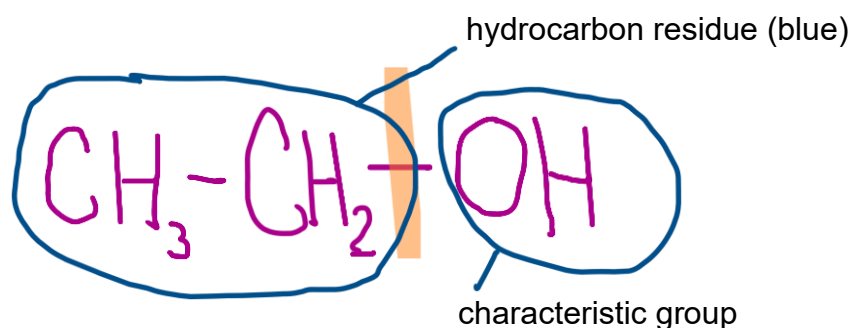
Worksheet

Topic: Hydrocarbon derivatives

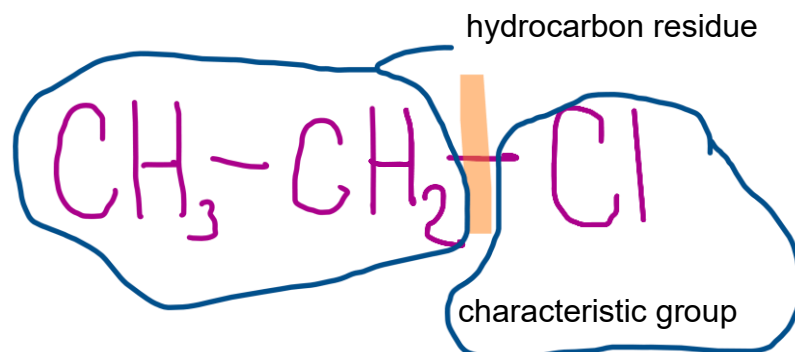
Hydrocarbon derivatives are compounds ... that are derived from hydrocarbons by replacing one or more hydrogen atoms with another atom or group of atoms ...

Draw: a hydrocarbon derivative (red colour)

Ethanol: $\text{CH}_3 - \text{CH}_2 - \text{OH}$ Divide (highlighter) the hydrocarbon derivative into:



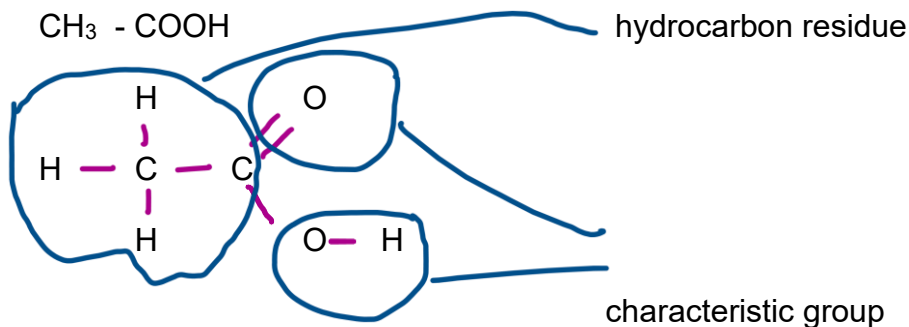
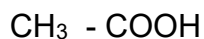
Draw: a hydrocarbon derivative formed by replacing one hydrogen atom in an ethane molecule with a Cl atom. Divide the hydrocarbon derivative into:



Acetic acid

Divide the hydrocarbon derivative into:

Draw the bonds between the atoms.



(There is one double bond C = O in the molecule.)

Fill in the blanks:

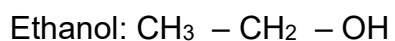
Hydrocarbon derivatives are among **the most widespread**..... organic compounds.

Worksheet Topic: Hydrocarbon derivatives

Hydrocarbon derivatives are compounds that

.....

Draw: a hydrocarbon derivative. (red colour)



Divide (highlighter) the hydrocarbon derivative into:

hydrocarbon residue (blue colour

characteristic group

Draw: a hydrocarbon derivative formed by replacing one hydrogen atom in an ethane molecule with a Cl atom. Divide the hydrocarbon derivative into:

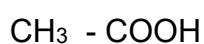
hydrocarbon residue

characteristic group

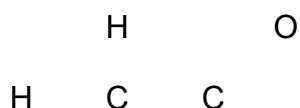
Acetic acid

Divide the hydrocarbon derivative into:

Draw the bonds between the atoms.



hydrocarbon residue



H O H

characteristic group

(There is one double bond C = O in the molecule.)

Complete:

Hydrocarbon derivatives belong to organic
compounds.

Methodological evaluation

The lesson is in line with educational standards. It has specific and measurable objectives and includes practical connections. It is a combined lesson, including teacher explanation and an experimental part with a demonstration experiment and activating teaching elements. Visual learning is supported by the use of digital technologies and an interactive whiteboard.

The presence of a teaching assistant allows tasks to be differentiated according to the abilities of individual pupils. The difficulty of the tasks can be graded so that all pupils can master them and be motivated to learn. Formative assessment based on self-reflection is also included.

The competency profile assumes the individual ability to work with information and develop it further. Communicate acquired knowledge verbally or visually, know how to use digital technologies, think through procedures in the scientific field, and be aware of cause-and-effect relationships.

Conclusion: The lesson is methodologically sound, combining explanatory and experimental methodological approaches. This is a more demanding part of organic chemistry, and the chosen methodological approach meaningfully links theory with practical application. In terms of competencies, it primarily develops scientific and experimental learning.

Methodological evaluation prepared by: PhDr. Ivana Štibraná, PhD.

APPROVED

Mgr. Magdaléna Eliášová, school director

10 October 2025, Smolenice, Slovak Republic