Title: Renewable Energy

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Subject title: Renewable Energy Sources
Grade: 3rd or 4th grade
Level of performance complexity: medium

Teaching method: Collaborative learning strategy

Collaborative learning strategy is used when the goal of teaching is to strengthen interaction among students. Groups of students work together to solve problems, create a task, or create a product. Collaborative learning is based on the premise that learning is a social act.

Key words:
EU green plan, renewable energy sources, economy, energy markets

Correlations, interdisciplinarity and cross-curricular topics (CCT):
Power Electronics, Power Engineering, Thermodynamics, CCT: Learning to Learn, Personal and Social Development, Use of ICT and Sustainable Development

Learning outcomes:
- recognize the potential of renewable energy sources (A, B)
- understand the importance of using renewable energy sources (B, D)
- determine the benefits and limitations of using renewable energy sources (C, D)
- process the data obtained by the collaborative learning strategy (B, C)

Cross-Curricular topics expectations:

Learn how to learn:
- Information management; The student independently seeks new information from various sources, transforms it into new knowledge and successfully applies it in solving problems.

- Precisely defines the problem and all its elements, 2. Applies and tests different strategies and selects those that will effectively lead to a quality solution, 3. Critically analyses the problem-solving process and identifies opportunities to use newly acquired knowledge and skills in other situations.
- Planning; The student independently determines the learning goals, chooses the approach to learning and plans the learning.

Personal and social development:
- He manages his educational and professional path.
- Collaborative learns and works in a team.
- Collaborates, organizes, performs its task, sets hypotheses, develops its role in the team, makes decisions.

Use of ICT:
- The student analytically decides on the selection of the appropriate digital technology.
- The student takes responsibility for their own security in the digital environment and the construction of a digital identity.
- The student independently conducts complex research with the help of ICT.
- The student independently and responsibly manages the collected information.
- The student independently or in collaboration with colleagues presents, creates and shares new ones.
- The student independently or in collaboration with others creates new content and ideas or reshapes existing digital solutions by applying different ways to encourage creativity.
- The student presents, creates and shares ideas and works on a complex topic with the help of ICT.

Sustainable development:
- It critically reflects on the impact of our actions on Earth and humanity

Evaluations:

For learning:
- during the lesson the teacher encourages constructive discussion between the student and the student - teacher, encourages teamwork, presentation of facts and opinions (A, B, C)

As learning:
- evaluation and self-evaluation is achieved through homework (D)
- teacher will analyse the information gathered by the student with the students in the next lesson
- students will critically look at information given to them and encourage discussion (A, B, C)

Learned:
- the knowledge will be obtained through the activities of students in class and from homework (A, B, C, D)

Activity description:

A Renewable energy statistics

The teacher starts conversation with students about renewable energy, what it means to them. Explains what is EU Green Deal and why is important to act now. They are given a Eurostat statistic report to read and take notes.
Link: https://ec.europa.eu/eurostat/statistics-explained/index.php/Renewable_energy_statistics#Wind_and_water_provide_most_renewable_electricity.3B_solar_is_the_fastest-growing_energy_source

Students discover the meaning of the content themselves, and the teacher only directs them. In such learning, it is necessary to use as much as possible the independent work of students on problems related to the content to be mastered.

Teacher asks the following questions:
What is usage of renewable energy in Europe in last 15 years?
What are characteristics of some renewable sources of energy?
For what do we use energy from renewable sources?

Students talk to each other about the question accepting other people's ideas, critical and creative thinking, presenting one's own ideas. The teacher begins a discussion with students about the benefits of renewable energy.

B What do we know about renewable energy sources?

At the beginning of the activity, students are divided into groups. All together they will fill out K-W-L Chart about renewable energy sources. That's a starting point before research, and at the end they can compare notes.

K-W-L CHART		
What I KNOW	**What I WANT to Know**	**What I LEARNED**

The teacher provides students with the following websites or materials to help with the research:

- https://www.irena.org
- https://www.nrdc.org/stories/renewable-energy-clean-facts

The teacher asks students: **What renewable energy sources have best potentials in our country?**

The conversation is conducted in the direction that the students come to a conclusion on their own.

C Renewable Energy: What Can You Do Right Now?

Groups of students is given a task to explore what are opportunities as a consumer to make an impact on improving the environment through the choice of a greener energy solution.
Link for students to use: https://justenergy.com/blog/7-types-renewable-energy-future-of-energy/

What Can You Do Right Now?		
Group members:		
1.	What type of renewable energy sources can we use?	
2.	What is our goal?	
3.	What are possible benefits by sources?	
4.	What are possible limitations by sources?	

At the end of the lesson, students fill out K-W-L chart and compare notes they made as a group at the start.

D Independent work at home

As a independent work at home, students need to research and write a paper on **Renewable Energy vs. Traditional Energy**.

Additional literature, content and links:
Renewable Energy vs. Traditional Energy:

- https://justenergy.com/blog/renewable-energy-vs-traditional-energy-the-real-cost/

- https://group.met.com/fyouture/solar-energy-vs-fossil-fuels/63
- https://www.inspirecleanenergy.com/blog/clean-energy-101/renewable-energy-vs-fossil-fuels
- http://www.beachapedia.org/Renewable_Energy_vs._Fossil_Fuels_for_Electricity:_Facts_and_Forecasts

Support procedures

During the lesson, teacher pays special attention to students with disabilities and provides them with additional explanations and help. They are paired up with gifted students to make the adoption of new material easier and more understandable. Gifted students "hone" their communication skills in this way.
At the end of the class, teacher gives students with disabilities additional instructions on how to browse and search for information and video presentations.

Gifted students are given the opportunity to create teaching material on a given topic (mental map, PP, poster, etc.) which they present at the beginning of the next lesson.