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PROJECT “CONNECTING STEM WITH ART”

2021-1-LT01-KA210-SCH-000031296

INTEGRATED LITHUANIAN LANGUAGE, ART, GEOGRAPHY, PHYSICS AND FOREIGN (I) LANGUAGE SUBJECTS

MODULE

SUSTAINABLE DEVELOPMENT

<i>Subject</i>	The Lithuanian language, Art and Technologies, Geography, Physics, the English language
<i>Year</i>	9 and 10
<i>Duration</i>	24 lessons
<i>Aim</i>	To promote the conscious development of STEAM knowledge and skills in the development of renewable energy resources for future ecological lifestyle models.
<i>Objectives</i>	<ol style="list-style-type: none">1. Develop scientific understanding and process concept of renewable energy production and introduce alternative energy sources;2. Develop teamwork and intercultural communication skills;3. Promote creativity and critical thinking.
<i>Competences</i>	Communication competence - developing the ability to create, transfer and understand knowledge (facts, attitudes or personal attitudes), ethically use verbal and non-verbal means and technologies;



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Cognitive competence - the ability to know oneself and the world is developed, which is acquired by understanding (adopting) the cultural experience of humanity. Subject knowledge such as critical thinking, problem solving and the ability to learn as well as will and persistence are developed;

Digital competence - developing motivation and ability to use digital technologies to perform tasks, learn, solve problems, work, communicate and collaborate, manage information and create and share digital content efficiently, properly, safely, critically, independently and ethically;

Creativity competence - developing the ability to create and generate significant creative ideas and products for oneself and others, as well as the evaluation of problem solutions, while maintaining a harmonious relationship with oneself and the environment;

Cultural competence - developing cultural self-awareness, based on knowledge, active cultural expression and cultural awareness;

Citizenship competence - civic identity and civic power are developed, based on values, attitudes, knowledge and practical abilities, which enable, together with others, to responsibly create a democratic society;

Social, emotional and healthy lifestyle competence is when a person's self-awareness and self-control, social awareness, interpersonal relationship building skills, responsible decision-making and taking care of a person's physical and mental health are developed.

Results

Analyze, comment and discuss more complex cultural phenomena: values, ideas, beliefs, attitudes and behaviors, signs, symbols, historical facts.

Actively engage in specific artistic and cultural activities in the school, family and community.

Identify problems and creative opportunities, taking into account different perspectives, independently ask questions that help explain complex problems.

Collect and systematize the information needed for creation according to several criteria, choose information gathering strategies in a reasoned manner, raise ideas, use various thinking operations (analysis, synthesis,



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comparison, generalization, classification, abstraction, etc.). Raise significant ideas and decisions for themselves and others. Flexibly choose and ethically use operational tools and methods of operation. Follow the rules of creative activity, adjust them, combining personal and other interests.

See subject content as a collection of ideas. Be interested in new things, purposefully look for information. Think about the meaning of abstract concepts. Master an individual writing style, write and express thoughts fluently. Read and analyze texts, integrating new subjects into existing systems. Process the information under consideration, apply analysis techniques and methods. Model real-life situations that help to understand and evaluate the limitations of the subject's theoretical approach, and encourage the search for new methods. Perform tasks that encourage finding assumptions, evaluate different points of view.

Understand the personal responsibility as a citizen in creating a sustainable ecological environment. Discuss the topics of cultural and nature protection issues and provide possible ways to solve them.

Convert digital content to the most appropriate formats based on instructions and own needs, as well as in complex situations; create purposeful digital content. Benefit and help others to use digital technologies creatively.

Set a clear goal and plan ways to overcome obstacles to achieve that goal using sources and/or resources. Value personal contribution (as a team member or a leader) to the success of the group work. Analyze the role of personal qualities in team work. Listen carefully and analyze.



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Lithuanian language

3 lessons

Objectives:

1. When analyzing the works, students use concepts and relate them to the interpretation of the meanings and genre features of the work;
2. Indicate the type, genre, functional style of texts, explains their main characteristics and purpose;
3. Connect the read works with modern culture and its phenomena, problems of own and community life.

Parts of the lesson	Teacher's activities	Students' activities	Methods/Methodological tools
Introductory part – motivation, interest.	The teacher asks the question: "How much truth can we see in fairy tales?" To believe or not to believe in fairy tales?" Summarizes the students' answers, offers to check, justify on the conclusions formulated by the scientists and presented in the textbook.	Students answer after thinking. Answers are checked in sources by quoting or paraphrasing the thoughts of mythology researchers.	Brainstorming, work with sources.
Announcement of the lesson's aim and objectives.	The teacher announces the topic of the lesson, its aim and objectives.	Take notes.	Attentive listening.



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<p>Activities:</p> <p>1. Careful reading and analysis of the saga (legend) about wind</p>	<p>Presents the text and information.</p>	<p>By carefully reading the text, students find information and write down the elementary plot of the saga, describe the acting figures, distinguishing their characteristics, indicate what artistic means are used to create the pictures of the characters, discuss the genre characteristics of the work, and discuss human behavior with nature and the consequences of behavior.</p>	<p>Careful reading, analysis, work with sources.</p>
<p>2. Discussion of the saga (legend) about wind, presentation of conclusions</p>	<p>After the students have completed their work, the teacher listens to the answers, leads the discussion, if such arises, helps to agree on the answer options, advises to check the answers that require theoretical knowledge, based on the homework material. Provides a conclusion: respectful behavior, harmony with the spirits of nature helps to live well and safely, the opposite behavior is dangerous for a person, because the forces of nature are more powerful.</p>	<p>Present the answers, check the answers, discuss if required, and present a conclusion.</p>	<p>Discussion, presentation.</p>
<p>3. Deepening the topic. Presentation of the book about ancient</p>	<p>Introduces the book, comments on the content, indicates what to read. It is emphasized that Lithuanians and Balts believed in Wind Gods,</p>	<p>Mark the title of the book and the pages that students will need to read and use information when preparing the project presentation.</p>	<p>Attentive listening, presentation.</p>



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Lithuanian mythology and religion.	they were considered all-knowing, all-powerful, therefore, agreement with them was important. Wind is a force that can change human life.		
4. Summary of the lesson. Perspectives. Presentation of expected project activities.	Presents the goals, tasks, themes of the planned project ("Wind in Lithuanian fairy tales", "Wind in Lithuanian proverbs", "Wind in Lithuanian poetry"), time to do a project (2 weeks), dissemination (article on the website of the school, on Facebook).	Note the information, divide into groups.	Project.
5. Performance of project activities.	The teacher offers resources and advises.	Activities and responsibilities are distributed in groups, students collect material, analyze, systematize, prepare a presentation according to the agreements (at least 10 presentation slides).	Working in groups, analysis of sources, careful reading, preparation of slides.
6. Presentation of completed project works.	Presents project activity evaluation criteria, dissemination methods, listens to the presentations, leads self-evaluation, and summarizes the work.	Present the completed work, take photos, participate in the evaluation process, write an article, disseminate information about the activity.	Presentation, monologue, evaluation.
7. Summary of activities.	Writes the Final Evaluation for the Work. Helps to write the article, select illustrative material.	Present ideas for the article, illustrate, write, and send to specified addressees.	Article writing.

Prepared by Lithuanian language and Literature teacher, methodologist Violeta Žudienė.



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Foreign (I) language, English

3 Lessons

Objective

1. After discussing the example and repeating the topic words, students will write an essay discussing the advantages and disadvantages of renewable energy sources.

Parts of the lesson	Teacher's activities	Students' activities	Methods/Methodological tools
Introductory part-motivation, interest.	The teacher asks the students about the renewable energy sources they know. Students write the answers on the board.	Students name the renewable energy sources they know and write them on the board.	Brainstorming.
The topic and the objective of the lesson	The teacher announces the topic of the lesson, its objective.	Take notes.	Attentive listening.
Viewing and discussing visual material.	The teacher presents the audiovisual material, divides the students into groups, instructs the students to write notes about the positive and negative aspects of renewable energy sources.	Watch the video twice and make notes. Discuss in groups and give group answers. Next to the renewable energy sources written on the board, mark the positives and negatives.	Review of audiovisual material https://youtu.be/1kUE0BZtTRc Mediation.



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<p>Discussion of the example, interpretation, preparation of the plan.</p>	<p>The teacher shows an example of an essay presenting advantages and disadvantages on the board. It is recommended to prepare an individual plan by choosing from the disadvantages and advantages listed on the board.</p>	<p>Students create their own plan using advantages and disadvantages presented by the groups.</p>	<p>Discussion, summary.</p>
<p>Writing an essay</p>	<p>The teacher introduces the topic of the essay and specifies the evaluation criteria. "Advantages and disadvantages of renewable energy sources" Write at least two arguments to support your opinion. 160-180 words.</p>	<p>Students write an essay using the prepared plan.</p>	<p>Individual work.</p>
<p>Discussion of the written work and correction of errors.</p>	<p>The teacher comments on the students' essays by providing a summary of the structure of the writing, vocabulary usage and grammatical errors.</p>	<p>Students correct mistakes, help others to correct, discuss individual mistakes.</p>	<p>Individual work, work in pairs.</p>

Prepared by English teacher, methodologist Eglė Balsienė



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Geography

Year 9

3 Lessons

Objectives:

1. After remembering and discussing the planets of the solar system and the importance of the Sun in our lives, students will analyse illustrations about the balance of solar radiation, the influence of the sun in different geographical latitudes;
2. Studying the map with countries developing solar energy students will clarify the principles, advantages and disadvantages of solar energy;
3. Students will make a demonstration poster about solar energy and present it to others.

Parts of the lesson	Teacher's activities	Students' activities	Methods/Methodological tools
Introductory part - Interest	<p>The question is presented from the knowledge about the solar system acquired in previous lessons.</p> <p>Students are asked to indicate 3 arguments each why the Sun is important for people and nature.</p>	<p>Respond.</p> <p>Discusses the importance of the Sun.</p>	<p>Discussion.</p> <p>Illustration "Solar System".</p>
The aim and objectives of the lesson	The aim and objectives of the lesson are announced.	Students formulate objectives themselves.	



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Activities	Students are presented with geographical information and questions about the solar radiation balance, the solar tributary in different geographical latitudes.	Students are listening. Work in groups/pairs. Students analyse, compare and evaluate available information.	Students are given handouts and worksheets.
Interim discussion	The questions are discussed, the teacher asks the students to comment on the map and illustrations when answering the questions.	Students present their studied material, provide answers to questions. Complement each other's answers.	Multimedia with prepared maps, illustrations.
2-3 lessons Activities	The importance of using alternative energy sources is discussed and how to live live in a more sustainable and Earth's resources saving society. The teacher offers the students to work in groups. The task is to prepare a poster "Solar energy in Lithuania and the world" according to the given criteria.	Students work in groups. Analyse texts, select the necessary information about the solar energy, advantages and disadvantages, countries using solar energy. Draw illustrations, make a poster.	Demonstration about sustainable development goals. Poster preparation plan.
Presentation of work results	The teacher asks to share the results of the work: a created poster about solar energy.	Students submit work results.	

Materials: A3 paper, markers, colouring pencils.

Prepared by Geography teacher, methodologist Aušra Skrebiene



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Art and Technologies, Year 9

3 lessons

Objectives:

1. After becoming familiar with the Balts symbolism and not copying the Balts symbols, students will create their own symbols;
2. After finding out what helical and spiral symmetry, statics and dynamics are, students will develop abstract, graphic and decorative drawing skills.

Parts of the lesson	Teacher's activities	Students' activities	Methods/Methodological tools
Introductory part – motivation, interest.	The teacher shows the pagan symbols representing the sun and the wind (Google search for ideas and images)	Mark the most liked symbol in the notes, name what this symbol represents.	Presenting information.
Announcement of the lesson's topic and objectives	The teacher announces the topic of the lesson, its objectives.	Make notes.	Attentive listening.
Activities	Introduces students to the basic symbols of Balts (Baltic tribe): triangles, circles, crosses, swastikas, suns, squares. Advises on how to make a stencil of the chosen motif, discusses the chosen colors.	Students draw sketches on small-format sheets of paper. Students select the central composition, choose colors. Enlarge the selected motif in A-3 format. Make a motif stencil. Take the canvas bag and paint with textile dyes in selected colors. After the paint dries, the sign is decorated with textile pens,	Individual work.



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	Prepares canvas bag exhibition.	The drawing is smoothed in a hot wire to fix the paint. Prepare the canvas bags for exhibition.	
The result Reflection	Asks students why they have chosen specific colors. The teacher reminds that stylized elements can be composed symmetrically, asymmetrically, in the center, and can fill the entire surface. The rhythm and shape of the ornament gives one or another mood.	Students discuss their work, comment and help other students to discuss.	Discussion, mediation.

Materials: paper, pencils, textile pens, rulers, compass, textile dyes, brushes, canvas bag.

Prepared by Art teacher, methodologist Jovita Šikšnienė



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Art and Technologies, Year 10

3 lessons

Objectives:

1. Students will get acquainted with the meanings of colors and the technical possibilities of painting to convey mood and movement;
2. After finding out what monotony and expression are in music and art, students will be able to achieve expression in their works by means of their choice.

Parts of the lesson	Teacher's activities	Students' activities	Methods/Methodological tools
Introductory part – motivation, interest.	The teacher announces the lesson topic and objectives. Students are told about expressionism as an art Movement, the most characteristic works are shown, e.g. V. Kandinsky, E. Munk.	Mark the favorite work and artist in notes.	Presenting information.
Activities	<p>Introduces how to convey movement and energy by summarizing, contrasts, bold composition of the work, lines and color tones.</p> <p>Discusses the sketches with students.</p> <p>Helps to prepare works for the exhibition.</p>	<p>Students draw several motif sketches on the theme of wind. A figurative composition, landscape or abstraction is drawn.</p> <p>Enlarges the selected motif in A-3 format. Paint the landscape in warm or cold colors.</p> <p>After choosing a graphic technique, use markers, pencils.</p> <p>Prepare works for an exhibition at school.</p>	Individual work.



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The result Reflection	Asks students why they chose specific colors, how combined them, what lines create a specific mood.	Students discuss their work, comment and help other students to discuss.	Discussion, mediation.
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Materials: paper, pencils, pens, rulers, colored pencils, watercolor, gouache.

Prepared by Art teacher, methodologist Jovita Šikšnienė

Physics

12 lessons

Objectives:

1. Using secondary raw materials, create an anemometer.
2. Get to know Bernoulli's law
3. Repeat the circle length formula, average speed formulas.
4. Familiarize yourself with the MicroBit programming environment.

It is recommended to carry out activities in the STEAM centre.

Parts of the lesson	Teacher's activities	Students' activities	Methods/Methodological tools
Introductory part – motivation, interest.	The teacher asks the students if they have tried to measure the wind speed. It is asked what the importance of measuring wind speed is.	Students answer the questions.	Discussion



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Announcement of the lesson's topic, aim and objectives	The teacher announces the topic of the lesson, its aim and objectives.	Make notes.	Attentive listening.
Activities	<p>The teacher explains how technical devices are created in different ways to achieve the best result. Explains about materials compatibility between each other, and their technical characteristics. Comments on which materials and why they should be chosen in order to complete the assigned task.</p> <p>It is reminded how from technically prepared drawings, using CNC technology, we can get a ready material blank for construction. See Appendix No. 1.</p> <p>The fundamental programming algorithm is explained. Reminds how the program code should work, what functions, when to call, what result and when to use.</p> <p>Reminds how to read simple electrical circuits and how to safely use a soldering iron.</p> <p>An example of how to assemble a technically sound anemometer is shown.</p>	<p>Using secondary raw materials (used cardboard boxes, packaging), students cut, glue and create a model of an anemometer. Decorate it with wind symbols.</p> <p>Using the MicroBit programming environment, student create the software code that will measure the wind speed.</p> <p>After repeated application of physical formulas in the program code and familiarization with the MicroBit programming environment, students becomes convinced of how the physical formulas describe the regularities of the existence of our world.</p>	Individual work. Mediation.



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		Solders and connects electrical circuits. Tests the anemometers being developed, corrects errors.	
The result Reflection	Organizes a race of manufactured anemometers and discusses the work done.	Students tell what the hardest, easiest and most interesting thing about building an anemometer was.	

Materials: cardboard, hot glue, wooden sticks, jumper wires, microbit microcontroller, computers, photoresistors, LEDs, CO2 CNC laser machine, breakable blades, scissors, soldering station, insulating materials.

Prepared by Physics teacher, methodologist Lilijana Nikolajenko



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Appendix No. 1

Knowledge (concepts, phenomena)

1. Bernoulli's law;

2. Applicable formulas:

circle length (according to which we found out the path travelled by the wing) $l=2\pi r$

average speed $\bar{v} = \frac{l}{t}$

for wind speed calculation: $v=(2\pi r n)t$

n- number of revolutions.

t- time

3. The MicroBit programming environment is used to create the software code that measures the wind speed.

Formulas for programming are used to determine the time change from which the total time is calculated.

Activities

a The device is used for measuring the lifting work of a wing.

The frame is cut from cardboard with laser.

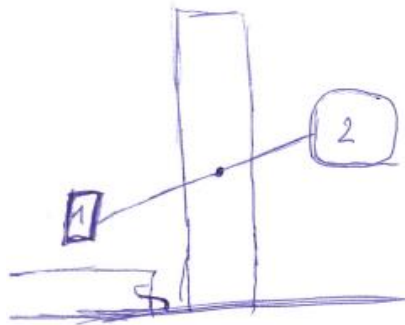
Weight of known mass (1), counterweight (2)

The wind blowing into the wing model changes the weight, the change of which is recorded as the work done by the wing.

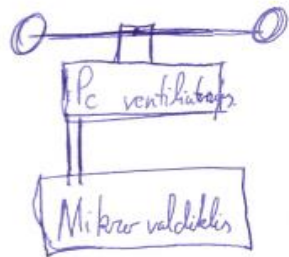
b An anemometer (model of a wing constructed by students) made from simple elements, using a computer fan to which an impeller is attached to capture the wind.



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a



b