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E-STEAMSEL Preparing Youth for the Future Labor Market with STEAM and SEL

STEAM LESSON PLANS FOR PRIMARY SCHOOL LEVEL

Partners:
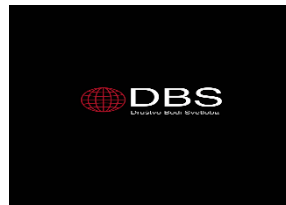
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1.WHY DO WE REQUİRE THE E-STEAMSEL PROJECT?

Today, knowledge accumulation is growing very rapidly and overflowing beyond the walls of the classroom. Within the education eco-system; developing analytical, critical thinking and problem solving skills became an important goal in order to become a productive society. We all have a collective responsibility, more than ever, to support the development of today's young people from a holistic perspective for a sustainable economy and society and to prepare them for the 21st century skills-based system. There is a rising momentum all over the world to keep up with the technology revolution.

Today's students will grow to pursue careers that do not yet exist. More than ever, it is necessary to prepare our students today so that they have the confidence to invent the world they want to live in. It is important to equip them with 21st century skills in STEAM (Science, Technology, Engineering, Art and Mathematics) and Social and Emotional

Learning (SEL) (Self-awareness and management, Social Awareness, Relationship Skills, Responsible Decision Making). According to the article of the World Economic Forum titled "New Vision for Education: Promoting Social and Emotional Learning Through Technology'':"People who can cooperate, have high communication skills, can produce solutions to problems with rational methods will be able to exist in the business life of the future. This social and emotional competence equips students to succeed in the evolving digital economy."Also, UNESCO recently sent a call to schools to implement SEL practices. By 2027, jobs requiring STEAM skills are expected to increase by 13%.EIGE's economic benefits of gender equality study (2017) show that reducing gender discrimination in STEAM education alone leads to 1.2 million additional jobs in the EU. In this context, our aim is to empower teachers, especially girls and secondary school students with multiple disadvantages, in STEAM and SEL areas and to motivate them to use their skills in a wider way. E-STEAMSEL is to give every student the opportunity to learn about technologies and to help them define themselves as innovators and changers who can take an active role in finding solutions to the problems they care about. In addition, to support them to be individuals who are sensitive to environmental problems and have an aesthetic point of view. It is now a necessity for our youth and girls to have STEAM and SEL learning skills in order to take part and struggle in the challenging business world of the future. STEAM mainly focuses on skill development in the fields of science, technology, engineering, arts and mathematics. SEL provides life skills in the fields of teaching and developing the skills needed tomanage great emotions, build relationships, gain self-awareness, solve problems, make responsible choices, and set goals. These two complement each other. The world of the future needs individuals with mathematics, science and technology literacy, self-actualized in social and affective learning, creative problem solving and aesthetic values. In this context, our project has adopted the STEAM and SEL fields as a whole and develop them at the transnational level with an e-learning Platform as its main objective is to prepare our students for the digital world of the future.

WHAT ARE THE OBJECTIVES?

OUR AIMS ARE TO;
* Ensure creative and meaningful participation of girls and young generation with multiple disadvantages in STEAM and SEL education, preparing them for the future labor market

* Raise and spread awareness and sensitivity among teachers, schools and parents in the field of STEAM and SEL learning

* Ensure inclusion, equality and easy access in STEAM and SEL learning areas, and to raise the skills-based literacy of especially disadvantaged youth and girls to higher levels.

* Provide digital content and digital-skills supported transformation in teaching and learning processes

* Develop practical ideas of how to involve students into the learning activities and create environment in which students can study in an innovative way

* Ensure equal access to project result for both genders

OUR GOALS ARE TO;
* Develop a virtual platform as a resource center for practical and innovative learning solutions that complement the curriculum of schools;

* Create a moodle-based e learning platform

* Produce materials for three separate sections on the platform

* Skill-based learning e materials (STEAM)

* Produce Social and Emotional Learning activities

*İnteractive Counseling Services for Parents And Students

The idea of creating and implementing such a tool is the answer to the call for modernity, digitalization, computerization related to every aspect of life.

WHO ARE THE USERS?

The project will target 3 groups:

1. Teachers in Primary, secondary and hıgh school.

2.Students in primary, secondary and high school.

3. DECISION MAKERS, Policy formulators, NGOs, youth workers and public, school directors, EU authorities AND Parents.

HOW TO USE THİS BOOK?

In this document, there are STEAM lesson designs for primary school students prepared with the problem-based learning method that teachers can use in their classroom practices.

Our teacher colleagues can apply the plan exactly if they wish. Or they can take the plans as an example and tailor them to their class. Whatever you want to do, you are at the helm.

If you're new to STEAM, please take a look at our teacher's guide and training program first.

The Benefits of Teaching STEAM Lessons

Exposes students to the creative process

When students engage in activities that combine different elements of STEAM, they experience guided inquiry in which they must ask thoughtful questions, discover answers, apply what they learn, and problem-solve creatively. Students learning how to make a wire sculpture that lights up must ask questions about how it works, try out different wiring techniques to get the sculpture to light up, think about the meaning behind their artistic creation, and experience the creative process, going from a design on paper to a tangible, functional object.

Offers meaningful collaboration

Many STEAM projects involve teamwork and thoughtful dialogue in which students exchange ideas and discuss ways to problem-solve. Through these activities, students learn how to divide up responsibilities, compromise, listen to and encourage each other. Some students might approach STEAM with excitement or curiosity, while others might be more timid or apprehensive.

Strategically placing students together in groups can create powerful teams in which students learn how to help each other and figure out how to use their different strengths and skill sets. If students are learning how to create 3D art depicting sea animals, one student might be knowledgeable about aquatic animals, another might be familiar with optical illusions or excited about constructing 3D glasses. Together, their knowledge, enthusiasm, and skillsets can be utilized to help successfully complete the project as a team.

Increases critical thinking

STEAM projects require students to systematically think through problems, applying the information they learn along the way about technology and engineering to figure out the best solutions. Cross-curricular projects also engage different parts of students' brains so that they are seeing the project through different lenses, focusing on details while also learning to step back and look at the bigger picture.

Provides a unique way to problem-solve

American students don't tend to do as well as students from other countries when it comes to international assessments that measure math, science, and problem-solving skills. STEAM projects give students a chance to problem-solve in unique ways because

they're forced to use a variety of methods to solve problems that pop up during these types of activities. By experiencing trial and error, learning how to take risks, and figuring out how to really "think outside the box", students get away from the commonly used approach of applying a known method or formula to solve a set of problems in a step-by-step way. With STEAM, they must solve in more creative, non-linear ways.

Gives all students hands-on learning experiences

While some students grow up in homes in which they are taught how to build and fix things, and are given many manipulatives to do so, others aren't exposed to these important learning opportunities. STEAM projects give students a chance to engage in hands-on, experiential learning. Students are often using different materials and tools in order to discover how something works, how to build it, and how to fix it. This levels the playing field so that all students acquire these crucial skills, regardless of their gender, socioeconomic status, or race.

Encourages girls to explore STEM fields

Since girls and women are underrepresented in the fields of science, technology, engineering, and math, developing STEAM projects helps girls become familiar with these fields at an early age. Early exposure can increase their chances of exploring these fields further as they get older, and high-quality STEAM projects will still benefit boys as well so that all students are able to acquire these 21st-century skills.

Shows them a different way to value the arts

Using art in STEAM projects helps students understand how varied the arts are, and how they're an integral part of products that involve engineering, technology, and mathematics. The arts can help increase engagement in STEAM projects since students can connect artistic mediums that they enjoy (like visual arts and music) with more technical projects that may seem daunting at first, such as building an app or programming a robot. They're able to combine the familiar with the unfamiliar, acquiring new skills, and discovering the world of artistic innovation.

E-STEAMSEL Project

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LESSON PLANS FOR PRİMARY LEVEL

LESSON PLAN 1 • Keep The Heat Catch The Cold

LESSON PLAN 1: Keep The Heat Catch The Cold

LESSON : Science-Mathematics

Subject: Keep The Heat Catch The Cold

Grade: Primary(4)

Duration: 200 minutes (5 lesson hours)

1. Target Outputs:

1.1. Cognitive Process Outcomes:

Central discipline Outcomes:

*Develops ideas and theories by actively exploring real-world problems.

*It identifies key issues that clarify different perspectives and lead to better solutions.

*Consciously manages the design process to generate ideas, test theories, create innovative works, or solve real problems.

*He/She explains his/her thoughts and research results.

*Applies engineering approaches to specific problems.

*Prepares the prototype of the product.

Outputs from other STEAM disciplines

Science

- Designs experiments for heating and cooling of materials.

- Designs an experiment to show that substances can change state with the effect of heat.

- He/She designs an experiment to show that substances can change state with the effect of heat. Only melting and freezing are mentioned among the state changes.

Maths:

- Solves problems using units of meters and centimeters.

- Expansion forms the given cube.

- Estimates a length that it can measure directly with the most suitable length measuring unit and checks its estimation by measuring.

- Covers and measures the area of the figures with non-standard suitable material.

- Uses different notations to present the data it obtains.

- Solve problems related to daily life using information represented by bar charts, tables and other graphs.

- Creates research questions that require data collection.

Art

*Makes different designs using colors.

*Engineering

*Explains the basic processes needed for a project.

*Evaluates the benefits and risks of a design.

1.2. Social product outputs:

*Working as a team

*Communication,

*Ability to share problem and solution-oriented ideas,

*Fulfilling their duties and responsibilities,

*Ability to defend their ideas

*Presenting the product effectively,

* Understanding the importance of cooperation and collaboration.

*Approaches problems from a new perspective.

 *combines feedback effectively.

  *To be able to listen to your friends without prejudice

2. Materials Used:

2.1. Testing:

- 3 small cardboard coffee cups

- 4 large clear plastic cups

- 3 styrofoam cups

- aluminum foil, 20x30 cm

- 20 cotton balls

- teaspoon-sized spoon

- 4 rubber bands

- One Data Sheet and Results Sheet per student to be filled in during the experiment

To share with the whole class:

*hot water jug

*Plastic packaging

*Tray

*large book or magazine

*Freezer Cabinet

2.2. Testing:

*Color paper 4 sheets per group (white, yellow, red, black)

*Newspaper

*Scissors

*Transparent tape for making cube boxes from colored paper

*4 ice cubes per group

*A sunny day

2.3. For the Construction of the Prototype:

*Colored Paper (white, yellow, red, black)

*Recycle cardboard boxes

*Scissors

*Recycle plastic containers

*Glue

*Ruler

*Insulation materials suitable for your design (cotton, styrofoam or aluminum foil)

*paints

3. Resources

- https://www.youtube.com/watch?v=Z9wp7kOH3xs
- Kessler, James H. ve Andrea Bennett.WonderScience'ın En İyisi: Temel Bilim EtkinlikleriBoston, MA: Delmar Publishers, 1997. s. 207, 210-211.ISBN: 0827380941
- Cool Roof Resources for Federal Agencies. Federal Energy Management Guide, U.S. Department of Energy. http://www1.eere.energy.gov/femp/features/cool_roof_resources.html

- Do Different Colors Absorb Heat Better? Grades PreK-2. Education Resources Information Center. Office for Technology and Industry Collaboration, Tufts University and Department of Education. (alternate online location for activity) http://www.eric.ed.gov/ERICWebPortal/search/detailmini.jsp?_nfpb=true&_&ERICExtSearch_SearchValue_0=ED480661&ERICExtSearch_SearchType_0=no&accno=ED480661
- Richards, Roy. An Early Start to Technology from Science. London, UK: Simon & Schuster, 1990, page 64.
- White Roofs May Successfully Cool Cities: Computer Model Simulates Impact of White Roofs on Urban Areas. Posted January 28, 2010. Press release 10-016, National Science Foundation News. http://www.nsf.gov/news/news_summ.jsp?cntn_id=116283
- Kessler, James H. and Andrea Bennett. *The Best of WonderScience: Elementary Science Activities*. Boston, MA: Delmar Publishers, 1997. pp 207, 210-211. ISBN: 0827380941

4. Learning Methods and Techniques

Methods: Problem-Based Learning,Argumentation-Based Learning,Project-Based Learning,Discussion,Question-Answer and Collaborative Working
Techniques: Brainstorming, Vision Development, Observation, collaboration

5. Groups Considered to be Formed During the Activity:

The groups planned to be formed should be included in this section;
The following features should be considered in the Groups created.
*Groups should consist of 2-4 people.
*It should be noted that it is a homogeneous group in terms of level.
* Gender distribution should be equal.

6. Implementation Phase;

6.1 Preparation Phase:
Create your student groups.
Choose your group leader
Choose a writer

6.2: Presenting the problem situation to the student:

Class A will go to a picnic as an end-of-year summer school activity. Class A students are very excited and happy to go to the picnic. Class A students plan the food they want to eat at the picnic by making certain preparations before they go to the picnic and prepare their food with their families. Worried about the hot drinks. If you were in this class;

What would happen if you packed these groceries in your backpack when you went on a summer picnic?
How would you take your food and drink?

6.3: Getting Information (Leading Questions)

In order to find a solution to the problem, the teacher asks the students to think about the following questions, do research and write down the information they have gained. Students do their research on the subject in groups.
*What kinds of devices have you seen to keep things hot and cold? What kind of materials do you think these devices are made of?
*What are insulation and conductivity? What are their effects on keeping objects cold or hot?
*What kind of materials should be chosen to slow down the heat flow?
*Does color matter to keep objects warm and cold?
*Imagine it's 100 degrees outside. How do you stay cool? What kind of clothes do you wear? Any ideas for coloring?
*What color is best to help prevent ice cubes from melting too quickly in the sun?
*Which color absorbs heat the fastest in the sun?

6.4: Idea Development

Determining the Requirements of the Problem;

Groups move on to the idea development stage. Each group shares their ideas with their groupmates in the light of the information they have acquired in the previous stage. In this section, they try to answer the question of what they might need to solve the problem.

The teacher transfers the theoretical knowledge to the students at this stage.
The flow of heat from hot to cold is an inevitable fact of life. Humans have tried hard to stop this natural physical behavior, but all they can do is slow down the process. Temperature regulation is important in many areas of engineering. Packaging engineers design containers and systems to reliably ship products at certain temperatures. Mechanical engineers ensure that running motors do not overheat, and electrical and computer engineers design electronics so that they do not overheat. Civil engineers determine the most suitable insulation materials for the climates in which their structures are located. Temperature regulation provides an understanding of the principles of heat transfer that apply to nearly all engineering disciplines.   Insulation helps keep cold things from getting hot and hot ones from cooling. Insulators do this by slowing down heat loss from hot things

and heat gain from cold things. Plastic and rubber are generally good insulators. That's why electrical wires are coated to make them safer to handle. Metals are generally good conductors. In fact, copper is used in most electrical wires and circuit boards for this reason.

The cooler helps keep drinks cold as it acts as an insulator and slows the transfer of energy from one source to another, meaning it helps keep the inside of the cooler cold and heat out. The opposite of insulator is conductor. What do you think a conductor does? (Listen to student ideas.) Yes, that's right, a conductor speeds up the transfer of energy from one source to another. If you have opened the lid of a pot cooking on the stove before, you may have experienced this. A metal pot is a conductor and heats up quickly on the stove, making it cook food faster or boil water faster. Be careful before touching a metal pot because you could get burned.

What if you could design a heatsink using a material that acts as a conductor? Or a pot with a material that acts as an insulator? (Listen to student ideas.)

Can you think of any examples where the color of something makes a difference to how hot it is in the sun? (Listen to student opinions. Amenities: Wearing black versus white on super hot days. Flat roofs are covered with black tar and white polymer material. Barefoot on a black asphalt road walking and walking on a lighter concrete road. Instead of choosing a white car, choosing a black car if you live in a place that is always sunny and warm...)
The sun emits energy in the form of electromagnetic waves. We see part of the electromagnetic wave as light and feel part of it as warmth. Darker colors absorb more sunlight than light colors, so dark colors heat up more quickly in sunlight than light colors. Lighter colors reflect most of the sun's radiant energy, so touching them in sunlight They stay cooler.

6.5: Product development:
Identifying Possible Solutions;
At this stage, groups of students identify possible solutions using the brainstorming technique. And the person who writes takes notes.
Choosing the Best Solution:
The solutions proposed in the previous stage are evaluated in terms of their strengths and weaknesses, advantages and disadvantages, and the best solution is selected. At this stage, students are provided with three different insulation materials to prevent their food and beverages from getting hot. These are styrofoam, cotton ball and aluminum foil insulation materials. Air is also used as the fourth insulation material. Students are allowed to examine the insulation materials that will be given to them and make predictions for the insulation material that they think gives the best results. Students discuss their predictions with their groupmates and the class, and the scribe takes notes. In addition, students are provided to think about the relationship between color and heat and make predictions. Students test their predictions with two different experiments and

reach the best solution by creating a data analysis graph. With the data obtained, students determine the most effective insulation material and the right color choice and design containers to isolate their food and beverages. .

1. Testing(The most effective insulation material)

- Divide the class into groups of two to four students each.
- Distribute the materials and the blank data sheet (Appendix 1) to each group.
- Provide each team with three different types of insulation: Styrofoam, aluminum foil, and cotton balls. Air is the fourth insulation material. Ask students to place enough of each insulating material in each large plastic cup to cover the bottom of the cup. Do not put anything in the fourth largest glass because the air will act as an insulator for that container.
- Place a small glass in each large glass.
- Have students fill the space between the glasses, each glass with a different insulating material, and not fill 1 glass.
- Put 3 spoons of warm tap water in each small glass.
- Have each group cover each of their large glasses with plastic wrap held in by a rubber band.
- Place the glasses in the freezer. Check the glasses every 15 minutes to see which glass forms the ice first. Record the observations in the data table. Keep checking until you see the ice shape in all four glasses.
- Put the containers in the freezer until the ice freezes in all the containers.
- Take the glasses out of the freezer and place them on a tray.
- Pour very hot tap water into the tray
- Have them check their trophies every few minutes to see which of the teams melted first, second, third and fourth. Record the observations in the data table (Appendix 1).
- Conclude with a class discussion to share and compare results and findings.

2.Testing (Effect of Color with Heat)

*Divide the class into groups of two to four students each.
* Distribute the materials and the blank data sheet (Appendix 2) to each group.
* Distribute 4 ice cubes to each group of the same size.
*Make cubes with the students using 4 different colored (white, yellow, red, black) cardboard. *Preliminary studies are done on how to make a cube from a piece of paper.(*https://www.youtube.com/watch?v=Z9wp7kOH3xs)
*Have them place an ice cube in the middle of each colored box.
*Put the ice cubes in the sun until they melt.
*Have students check every few minutes and record which ice cubes melted first, second, third and fourth on the APPENDIX 2 form.

*Provide directions that have students create a bar chart representing the time it takes for ice to melt for each paper color according to the Appendix 2 Data Table. Discuss the generating bar chart with the deck.

*Talk about how these color properties help melt the ice.

*Ask students to give real-world examples of their understanding of how different colors reflect light and heat. (Example: Asphalt roads and tar roofs are dark surfaces that absorb heat from the sun. Measurements show that white roofs reflect some of the sun's heat back into space and cold temperatures, just as just as wearing a white shirt on a sunny day can be cooler. So, designing white roofing materials or roofing paint has the effect of cooling temperatures inside buildings.)

* Conclude with a class discussion to share and compare results and findings.

● **Making the Prototype:**

Instructor:

"Now you are packaging engineers, design containers and systems to reliably ship products at certain temperatures. Make your designs using the right insulation materials and colors in line with the results you have obtained," he/she says. Students design unique containers for their food and drink with the recycling materials and insulation materials they have. Collect and design as many recycled building materials as you can find. Use your creativity!

6.6. Sharing and Reflection

The shares envisaged by the students are taken into account. From the beginning of this process, feedback is received on the areas where they have developed themselves, learned and focused in line with their interests and abilities.

What are the science concepts you learned and applied in these activities?

What engineering skills did you learn and apply in these activities?

What creative ideas do you have that you need to research and develop more in these activities?

6.7. Evaluation:

Ask Research Questions. The instructor observes the students throughout the process, prepares questions or rubrics to evaluate the students' understanding of the subject and group work throughout the process.

What are the strengths of the offered product?

What are the weaknesses of the offered product?

Evaluate the product for accessibility and cost.

Share your suggestions to strengthen their weaknesses.

Were mathematical/scientific principles applied in accordance with the design and without errors?

Will the solution suggestions be consistent when associated with daily life?

LESSON PLAN 2

- **Characteristics of Substance**

LESSON PLAN 2: Characteristics of Substance

LESSON : Science

Subject: Characteristics of Substance

Class: 3 (9-10 years old)

Duration: 200 minutes (5 lesson hours)

1. Target Outputs:

Cognitive Process Outcomes:

Central discipline Outcomes:

*Explains the basic properties that characterize matter by using the five senses.

*Discusses that touching, looking, tasting and smelling some substances can harm the living body.

* Takes responsibility for taking the necessary safety measures while working individually or in groups.

Outputs from other STEAM disciplines:

Maths:

• Collects or selects data on research questions; displays data in frequency table and column chart according to their convenience.

Art:

He/She transfers his/her ideas through design and drawing.

Transfers warning symbols by drawing.

1.2. Social Product Results:

• Working as a team,

• Communication,

• Ability to share problem and solution-oriented ideas,

• Fulfilling their duties and responsibilities,

. Ability to argue, defend ideas,

• Presenting the product effectively,

• Understanding the importance of collaboration.

2. Materials Used:

• 1 Metal plate • 1 Foam plate • Acetone • Plastic gloves • Mask • Hot pepper •Lemon •Play dough • Sugar cubes • 1 Foam plate

Interactive Board, tablet, internet connection

3. Resources

https://learningapps.org/display?v=pq42kw8i322

*3rd grade Science Book Meb Publications. Page:115,116,117,118
https://ders.eba.gov.tr/ders/proxy/VCollabPlayer_v0.0.937/index.html#/main/curriculum/2/eba/3/feny?currID=76d066f3570f1354ec2544b55eb310a1&expand=false&isSub=false&schoolSubType=2&backID=-1

*https://dergipark.org.tr/tr/pub/dubited/issue/64337/848711 Year 2021, Volume 9, Issue 4, 1547 - 1562, 31.07.2021 Arzu ÖZTÜRK

https://doi.org/10.29130/dubited.848711

4.Learning Methods and Techniques

Problem Based Learning Method,
Argumentation-Based Learning Method
Project Based Learning Method
techniques; Brainstorming, collaborating, discussing

5. Groups Considered to be Formed During the Activity:

The groups planned to be formed should be included in this section;
The following features should be considered in the Groups created.
*Groups must consist of 4 people.
*It should be noted that it is a homogeneous group in terms of level.
* Gender distribution should be equal
.

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6. Implementation Phase;

6.1 Preparation Phase:

Create your student groups.
Choose your group leader
Choose a reporter

6.2: Presenting the problem situation to the student:

One day a child leaves school,
He/She came home and no one was home.
It's not very painful. Opened the closet,
He/She saw sugar, mistook the medicine as sugar.
He ate, he ate it all,
The pain started in the evening.
Be sure to check before you eat any food. Don't do that. Pay attention to the warnings on packaged food.
Do not think of medicine as sugar.

By singing this song, students think about the lyrics of the song. Then they come up with their ideas.
The teacher asks the following questions.
        Why did the child in the rhyme begin the pain?
        Why did the child think sugar is medicine?
        What precautions can you take when using certain substances so that our health does not deteriorate?
How can touching, tasting or smelling every substance harm our body?

Then the following activity is done.

        *The class is divided into groups of four.
        *Preparations are made to conduct an experiment describing the harms of some substances.
        *Acetone, foam plate, metal bowl, plastic gloves, mask, hot pepper, lemon, sugar cubes and play dough are placed on the tables.
        *Acetone is poured into the plate. The foam plate is brought into contact with acetone.
        *It is seen that the foam plate melts.
        *Lemon, cube sugar, hot pepper is smelled and tasted.
        *Play dough is touched.
         *Talk about the harms of substances.

Which of the substances given in the pictures below are dangerous to taste, smell, look or touch? What harm can it do to us? Write in the spaces below.
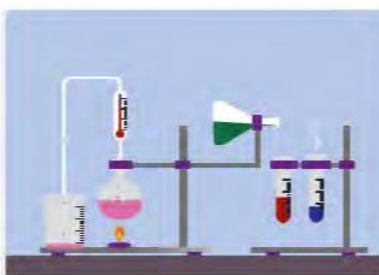
6.3: Obtaining Information (Leading Questions)

In order to find a solution to the problem, the teacher asks the students to think about the following questions, do research and write down the information they have learned. Students do their research on the subject in groups.
What are the security measures that can be taken against the problems mentioned below?

Some cleaning agents are similar to food or drink.
Tasting, smelling, looking at, or touching certain substances can cause harm.
Some drugs are similar to some sugars.
What can we do to take the necessary safety precautions when working individually or in groups? They are guided to take responsibility for taking the necessary safety precautions when working individually or in groups.

6.4: Idea Development

Determining the Requirements of the Problem;
Groups move on to the idea development stage. Each group shares their ideas with their groupmates in the light of the information they have acquired in the previous stage. In this section, they try to answer the question of what they might need to solve the problem.
There is general discussion with the class on the topic 'Some Substances Can Harm Our Bodies'.
Each group is given guiding questions. For example: What kind of safety mask do you imagine?

Using the collaborative method, they are provided to write their research and answers to the questions.

Looking, smelling, tasting and touching some substances can harm the living body. Most of the cleaning materials contain harmful substances. The substances found in the laboratory can be flammable, caustic or poisonous. It can be life threatening. When using dangerous substances, we must take safety precautions. We must wear masks, gloves and aprons.

6.5: Product Development:

Identifying Possible Solutions;

At this stage, groups of students identify possible solutions using the brainstorming technique. Solutions are noted.

Choosing the Best Solution:

The solutions proposed in the previous stage are evaluated in terms of their strengths and weaknesses, advantages and disadvantages, and the best solution is selected. At this stage, it is recommended to use the argumentation method. The most appropriate solution proposal is determined by the students through in-group discussions. The teacher can guide students to consider their time, costs, advantages and disadvantages when choosing the best solution.

Construction of the prototype:

After selecting the solution proposal to make a safety mask, the student groups are expected to create a prototype of the proposal to make a safety mask.

First, a sketch of a mask is made. Guiding questions are asked to calculate the materials to be used and the cost.

Attention is paid to the detail of the safety mask drawing and what each piece does.

They are asked to design this safety mask sketch drawn on paper in Canva. This design is implemented. The solution is tested and evaluated. The teacher is the guide.

6.6. Sharing and Reflections

Parents of the students are invited to the school to exhibit the products of the students, short video shoots are made and the parents are informed about the event. From the beginning of this process, feedback is received on how they have improved themselves and what they have learned in line with their interests and abilities.

6.7 Evaluation:

At the stage of presenting the in-class products of each group, they are asked to evaluate by the other groups by answering the questions below.

What are the strengths of the offered product?

What are the weaknesses of the offered product?
Evaluate the product for accessibility and cost.
Share your suggestions to strengthen their weaknesses.

Students come together with the groups they work with at the beginning and prepare a concept map about the substance cycle using the Mindmeister Web2 tool. This is recommended as a last resort. The created concept maps are shared with the whole class by the groups..

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LESSON PLAN 3	• **Lighting and Sound Technologies/ Sound Pollution**

LESSON PLAN 3: Lighting and Sound Technologies/ Sound Pollution

LESSON: Science

Subject: Lighting and Sound Technologies/ Sound Pollution

Grade: Elementary 4

Duration: (6 lesson hours)

1. Target Outputs:

1.1. Cognitive Process Outcomes:

Central discipline Outcomes:

*Questions the causes of sound pollution.

*Explain the negative effects of sound pollution on human health and the environment.

*It produces solutions to reduce sound pollution

Outputs from other STEAM disciplines

*Observes objects (object, entity) or events in various ways using one or more sense organs.

*Suggests explanations about the causes of events based on observations.

*Selects the necessary materials and tools in simple research under the supervision of the teacher; use it skilfully, safely and effectively.

*Reaches new relationships from the findings.

1.2.Social product outputs:

*Working in cooperation,

*Working in communication.

*Fulfilling their duties and responsibilities,

*Ability to express thoughts clearly.

*Ability to present in an understandable language

 * Solution-oriented approach to problems.

2. Materials Used:

Teacher: Computer and smart board, concept map

Student: Necessary materials for the experiment, textbook

Resources:

TC Meb Grade 4 Science Anka Publications Textbook

 https://www.youtube.com/watch?v=p7XkZleu9aY

4.Learning Methods and Techniques

   Invention-based teaching strategy, computer-assisted teaching, question-answer teaching technique, narrative method, case study, observation, concept map, drama.

5. Groups Considered to be Formed During the Activity:

Whole class

6. Implementation Phase;

6.1 Preparation Phase:

   The instructor enters the class with a flute (a cymbal instead of a flute, a plastic bottle with a ball inside, etc. may be preferred as a sound source depending on the environment). Do you like to play the flute with your students? he asks. He takes one of his students who knows how to play the flute to the classroom corridor. She asks him to move away from the classroom door. She asks him to start playing a melody he knows after he returns to the classroom. He instructs the student to slowly approach the classroom door while playing his flute and enter the classroom after one minute. The teacher returns to the classroom and asks the students to

listen to the sound. They are allowed to discuss whether there is an increase or decrease in the intensity of the sound they hear depending on the distance.

Then he asked the students, "If 3 students played the flute outside at the same time, would the intensity of hearing this sound change? question is directed.

Make students discuss this. Students are made to realize that the intensity of the sound increases as the sound source gets closer. Students are asked to give examples of situations where the intensity of the sound decreases as they move away from the sound source in their daily lives. Thanks to the intensity of the sound, they are made to understand that we can hear the sounds.

6.2: Presenting the problem situation to the student:

Nil is studying for a very important exam. He has a great room to study and the source books he wants. But the place where their house is located is in a neighborhood where there are restaurants and cafes where there is a loud noise. Intense noise prevents Nil from concentrating while studying and Nil is very disturbed by this situation.

If you were in his place, what would you do to solve the problem with the volume of the sound in your room?

6.3: Obtaining Information (Leading Questions)

The trainer makes the animation video related to the subject watch (https://www.youtube.com/watch?v=p7XkZleu9aY) up to 1.44 minutes and seconds and pauses the video and asks the following questions:
We watched the noise pollution in the animation. According to this, what kind of problems can occur as a result of noise pollution? poses the question.
Then the same video is played until 1.60.

We saw the results of sound pollution in the animation we watched. What do you think can be done to prevent sound pollution? It creates a discussion environment by asking questions.

6.4: Idea Development

Determining the Requirements of the Problem;

Students move on to the idea development stage. In this section, they try to answer the question of what they might need to solve the problem.

The trainer transfers the theoretical knowledge to the students at this stage.

Excessive and irregular sounds that disturb people create sound pollution. Sound pollution is also known as noise. Sound pollution is an environmental problem that

affects people negatively. Due to industrialization and urbanization, sound pollution is mostly seen in big cities.

Factors causing sound pollution:

*Sounds of vehicles in traffic (exhaust, engine and horn sounds),
*Sounds of construction machinery used in road and construction works,
*Sounds of machines used in factories and workshops,
*The sounds of music overflowing from entertainment venues and houses,
*Loud noises from household appliances,
*Human voices in places where people are collectively such as school, bus,
*Sounds in crowded environments such as market places, shopping malls,
*Sounds at the airport and its terminals,
*The voices of peddlers selling with megaphones,

Negative effects of sound pollution:
*It causes temporary or permanent hearing problems.
*Human health is adversely affected: Headache, tinnitus, dizziness, ulcer, increased heart rate and respiratory rate, heart rhythm disorder, mental health disorders are some of these.
*People exposed to loud noise experience problems such as distraction, insomnia, restlessness, restlessness and stress.
*Noise in the classroom environment causes distraction and negatively affects success.
*Noise in the workplace reduces work efficiency and can lead to work accidents.
*It affects the natural life negatively by causing the animals to be afraid and run away.

Things to do to reduce sound pollution:

*Music should not be listened to in a way that disturbs others.
*Tools such as vacuum cleaners and drills should not be operated at the appropriate time.
*By using public transportation vehicles, noise pollution in traffic should be reduced.
*Cars should have mufflers fitted to their exhausts.
*Drivers should not honk unless necessary.
*Places that cause noise pollution such as airports, terminals and stadiums should be established away from the city center.
*Highways and streets passing near the city should be planted.
*Factories and workshops should be built in places far from the city center.
*Sound insulation should be done in factories and workshops.
*In entertainment centers, sound insulation should be made to prevent the sound from coming out.
*The number of constructions in big cities should be reduced.
*We should not speak loudly in closed areas that we use in common such as school, classroom, bus.
*Loud music should not be played at home.

*The floor in our homes should be covered with carpet.
*In the windows, double glazing should be used with the air in between.
*Sound insulation of buildings should be done in environments where we do not want too much noise from outside, such as home, school, hospital, cinema, theater, library. (Materials such as foam, rubber, rubber are used inside the walls for sound insulation of buildings.)
Positive effects of instruments that produce loud sound: Used for warning,

- Sirens of ambulance, fire or police vehicles,

- Sirens located in factories, schools or some other institutions and used in case of danger such as fire, earthquake,

- alarms used in cars,

- Alarms that detect smoke, gas, high temperature in the environment and make loud noises,

- The whistle, which is used by traffic police from time to time and must be kept in earthquake bags,

- Door and school bells,

- Megaphone used for announcement,

- Tools such as microphones, amplifiers and speakers, which are frequently used in areas such as concerts, theater performances, and seminars, and which amplify the sound and enable everyone to hear, are the positive usage areas of sound producing tools in our live

6.5: Product development:
　　Students generate possible solutions on the subject.

　　1.We should not listen to the music loudly.
　　2.We need to insulate buildings.
　　3.We should prefer public transport.
　　4.We should not use klaxon unless necessary.
　　5.Industrial establishments should be established in places far from the city.
　　6.We should not speak loudly in public places.

Making the Prototype:
The instructor divides the class into two groups and the experiment "HOW IS SOUND INSULATION" is done. For this experiment, each group is given a sound source and a large jar of the same size and cotton. The first group puts the sound source in the jar and closes the lid. The other group puts the sound source in the jar filled with cotton and closes the lid. The sound is observed.
　　Then the students are asked to design a house from waste materials and soundproof the walls of this house.

6.6. Sharing and Reflections

The shares envisaged by the students are taken into account. From the beginning of this process, feedback is received on the areas where they have developed themselves, learned and focused in line with their interests and abilities.

What are the science concepts you learned and applied in these activities?

What engineering skills did you learn and apply in these activities?

What creative ideas do you have that you need to research and develop more in these activities?

6.7. Evaluation:

The instructor divides the students into groups of 4-5 and distributes a blank concept map. (Appendix 1)

Students are asked to complete this concept map by discussing it with their groups. The teacher asks guiding questions.

LESSON PLAN 4	• **The Structure of the Earth Let's Get to Know Our Planet/Earth and the Universe**

LESSON PLAN 4: The Structure of the Earth

LESSON: Science

Topic: The Structure of the Earth Let's Get to Know Our Planet/Earth and the Universe

Grade: Primary (3)

Duration: (240 min. 6 lesson hours)

1. Target Outputs:

1.1. Cognitive Process Outcomes:

Central discipline Outcomes:

• Observes objects (object, entity) or events in various ways using one or more sense organs.

• Determines various properties of an object such as shape, color, size and surface properties.

• Based on observations about the causes of events that have happened

• Can establish cause-effect relationships.

• Suggests explanations.

• Interprets the processed data and the generated model.

• Reaches patterns and relationships from the findings.

• Analytical thinking skills develop.

Outputs from other STEAM disciplines

Science

 Explains that there is a layer of air on Earth that surrounds us.

Visual arts

Makes two-dimensional visuals in his works.

Social

 While dealing with the subject of Natural Disasters, it can be mentioned in which sphere they occur.

1.2. Social product outputs:

*Working in cooperation,

*Working in communication.

*Fulfilling their duties and responsibilities,

 * Ability to express thoughts clearly.

 *Ability to present in an understandable language

 * Solution-oriented approach to problems.

2. Materials Used:

Foam Earth model

• Air Globe cardboard

• Balloon

• Glass

• Napkin

• A bowl of water

From Class to Space recycling plastic bottles, Aluminium foil, recycle hard cardboard, Felts in red and orange, Silver and gold colored paper pieces, large elastic band, red tape, Ruler, Black thread and needle, Scissors, glue and a pencil

Resources:

•TC Ministry of Education 3rd Grade Science Anka Publishing Textbook

4.Learning Methods and Techniques

Invention-based teaching strategy, computer-assisted teaching, question-answer, teaching technique, narrative method, case study, experiment method, observation, concept map, brain storming

5. Groups Considered to be Formed During the Activity:

The groups planned to be formed should be included in this section;
The following features should be considered in the Groups created.
*Groups should consist of 5-6 people.
*It should be noted that it is a homogeneous group in terms of level.
* Gender distribution should be equal.

6. Implementation Phase;

6.1 Preparation Phase:
The instructor first asks what the students know about the Astronaut and draws the students' attention.
6.2: Presenting the problem situation to the student:

Artun is a child who is very curious about space. He always dreams of becoming an astronaut, but he does not have the necessary clothes to go to space.

What happens if you don't have special clothes and an oxygen cylinder to go to space?

The question is directed to the students.

6.3: Obtaining Information (Leading Questions)

To find a solution to the problem, the instructor asks students to reflect on the following questions, do research, and write down the information they have learned.

Students do their research on the subject.

The instructor enters the classroom and tells the students:

Have any of you guys ever seen an astronaut before?

What kind of clothes do astronauts wear?

So why are they dressed like this?

Did you know that astronauts carry oxygen cylinders with them, and even that there are many spare oxygen cylinders on their spaceships? What do you think is the reason for this?

By asking their questions, they start to think about the importance of the air layer in our lives.

Then he/she starts to tell/read the story of ARTUN and ASTRONOT (ANNEX1).

6.4: Idea Development

Determining the Requirements of the Problem;

Students move on to the idea development stage. In this section, they try to answer the question of what they might need to solve the problem.

(The trainer pauses the story and asks the students the following questions and their answers are discussed in class…)

Why do you guys think the astronaut wanted Artun to wear an astronaut outfit?

Why weren't there plants, animals, living things on the Moon?

(The story continues and ends.)

The trainer transfers the theoretical knowledge to the students at this stage.

"Today we will learn what the Air Layer is," the Instructor tells his students.

What do you think is the atmosphere/air layer? The question is asked and the answers are written on the board and the class brainstorms.

Since it is desired to start by feeling while going through the subject, the instructor makes the students do a simple breathing exercise. (Let's close our eyes, take a deep breath, now let's breathe slowly, now let's breathe slowly again, let's feel the air filling our lungs, let's breathe out and open our eyes...)

How lucky are we guys that we don't need to wear special clothes like the astronauts in the story because we can breathe so easily? By asking the question, the student is guided to realize that the layer of air is everywhere.

This is because there is a layer of air surrounding our world. We call this layer of air, the air sphere or the atmosphere, guys.

Where do you think the weather is? Can you show? he/she asks, after talking about this subject, it is said that the inside of the classroom is filled with air, but we cannot see it, and the students are directed to the following experiments in order to feel the air that we cannot see.

Experiment 1: Let's feel the air experiment
Materials
•   Balloon

A balloon is distributed to each student. Students are asked to inflate the balloons (fill with air) but not to tie the end. By squeezing the balloon, the air inside is felt. Then, it is said that we should leave the end that we hold facing our wrist or palm. The air coming out of the balloon is felt on the skin.

After the comments about the experiment are received, the students are motivated to feel the air a little more closely.

Experiment 2: Wet Napkin Experiment
Materials
•   Glass
•   Napkin
• A bowl of water

First, the ingredients are counted (a glass of a few napkins and a bowl of water), do you think these napkins are wet or dry before you start the experiment? Anyone can come and touch it. Do you think the glass is wet or dry? is asked, interest is gathered. Napkins are folded and put into the glass and the glass is turned upside down and completely submerged in the water. Do you think the napkins get wet or not? Is the glass completely inside? So do you think it got wet or not? Let's slowly remove our napkin.

I wonder why it didn't get wet, why didn't it get wet? Students are directed to make comments by asking questions such as: After the comments are received, it is explained that there is a napkin in the half of the glass and it seems half empty, but that empty space is the air that surrounds our world that we do not see but that we are sure to exist, and that allows us and all Artunians to live.

The experiment is repeated by slowly lifting the glass and evacuating the air inside, and the air bubbles in the glass are clearly displayed.

The students' opinions on the experiment are asked and the explanation part is passed.

6.5: Product development:
*Identifying Possible Solutions;

He says that we have just said what we feel and call it the air layer or atmosphere, and in order to increase the permanence, he sticks the cardboards that read air sphere-air layer-atmosphere on the top of the board. This layer, which we call this way, completely surrounds our Earth, that is, it is everywhere, by first showing and explaining from the photograph, it is

shown that the air layer surrounds every part of the Earth by passing a bag to the material.

What do you think would happen if this layer that completely surrounds our Earth did not exist? is asked and the answers are listened to.

At this stage, groups of students identify possible solutions using the brainstorming technique. And clerk takes notes.

*Choosing the Best Solution:

The solutions proposed in the previous stage are evaluated in terms of their strengths and weaknesses, advantages and disadvantages, and the best solution is selected.

What would happen if there was no air?

• We couldn't breathe.

• Plants could not photosynthesize.

• Trees would not survive.

• Living things could not provide their oxygen.

• Since there would be no protective layer around the Earth, meteorites could hit our Earth.

• The harmful rays of the sun would reach our Earth

The air layer is one of the most important requirements for the existence of life. Air can be thought of as the source of life on Earth. So, we can say that if there was no air, there would be no life on Earth. Because animals, humans and plants can survive thanks to air, they cannot live in an environment without air. In other words, if there was no air, this order, which has been going on for years, would be broken and there would be no life.

*Making the Prototype:

From Class to Space

The trainer says, "What kind of outfit would you like to be a superhero and explore space with the simplest materials? Can you draw your dream astronaut outfit?"

Students draw their dream astronaut outfit. The trainer then asks the students to design the astronaut outfits they have drawn with the recycling materials in their hands.

The trainer poses guiding questions during the activity phase.

6.6. Sharing and Reflections

The shares envisaged by the students are taken into account. From the beginning of this process, feedback is received on the areas where they have developed themselves, learned and focused in line with their interests and abilities.

What are the science concepts you learned and applied in these activities?

What engineering skills did you learn and apply in these activities?

What creative ideas do you have that you need to research and develop more in these activities?

6.7. Evaluation:

The trainer evaluates the subject by associating it with the game. Games Appendix 2: Scoring Chart is used.

Game 1: What's going on in the air?

For this game, a student is brought to the board.
A picture related to the air globe is shown to the whole class so that the student on the board cannot see it (animals, vehicles, natural events…)
The students in the class tell the student on the blackboard what is in the picture.
If the student knows, the teacher pastes the picture on the Air Sphere cardboard that he brought to the class, empty beforehand.
The teacher writes the results on the Appendix 2 Scoring Chart.
At the end of the game, the cardboard is hung on the classroom board.

Game 2: True Wrong Game

In this game, students are given cardboard in the form of red and green cards. The sentences are read and if this sentence is true for the air globe, the student removes the green cardboard, if it is false, the red cardboard.
The teacher writes the results on the Appendix 2 Scoring Chart.
Sample questions to be asked in the game:
1) The air layer is the gas layer that surrounds the Earth from the outside. (T)
2) Earthquakes occur in the air layer (F)
3) The Earth is made up of layers (T)
4) Weather events such as rain, snow, hail take place in the air sphere. (F)
5) Plain, hill, mountain form the water part of the Earth. (T)
6) Although it is not seen as an air sphere, hydrosphere and stone sphere, it can be felt. (F)
7) Weather events occur in the water sphere. (T)
8) Fish live in the air sphere. (F)
9) The air sphere, which makes our world habitable, surrounds the Earth. (T)
10) We need air for our life. (F)

ANNEX 1

Astronaut with ARTUN

Artun was very happy that day. He was celebrating his birthday with his friends. Artun's friends brought gifts. Curiously, he opened the presents. Among them were wonderful books, balls, cars and a huge toy astronaut. Artun liked this toy astronaut the most. Artun, who was very tired after his birthday, hugged his astronaut and fell asleep.

In his dream, the toy astronaut had turned into a real astronaut, and a huge rocket was waiting for them outside. Holding hands, they got on the rocket and their journey into space began, when they landed on the Moon, Artun couldn't wait to get out and take a closer look. There were stones, sand, pits and hills on the moon. Looking around curiously, Artun wondered why there are no birds, flowers and trees like our Earth.

- Stop! he called out, showing the astronaut clothes in his hand, you can't go out without wearing them, or you can't breathe, he said...(The place where the story will be paused.)

Artun asked the astronaut why he should wear this outfit. The astronaut said that because the layer of air that surrounds the earth and allows us to breathe is absent on the moon, so we can wear this specially made suit and breathe as if there is a layer of air.

They got off the rocket, Artun was looking around in surprise, it was very different and exciting to watch the Earth from the moon, the Earth looked like a ball from there. While they were walking on the moon, Artun asked the question on his mind to the astronaut.

-Why are there no trees here, or why are there no birds?

The astronaut explained that since there is no air and water on the Moon, there is no life on the Moon, since his creatures need them to live.

Artun woke up from his sleep, realized that his heart was beating with excitement, he was impatient to tell his dream to his teacher while he was getting ready and going to school. He saw his teacher waiting in the classroom with a model of the Earth, similar to the Earth he had seen in his dream as a ball from the Moon. He told his dream to his friends and his teacher said that this is exactly what we are going to cover today, let's explore the properties of the air sphere then...

Appendix 2: Scoring Table

Student Name	1. question	2. question	3. question	4. question	5. question	6. question	7. question	8. question	9. question	10. question	TOTAL

LESSON PLAN 5 • Our Food

LESSON PLAN 5: Our Food

LESSON: Science
Subject: Our Food
Grade: Primary (4)
Duration: 200 minutes (5 lesson hours)

1. Target Outputs:

1.1. Cognitive Process Outcomes:

Central discipline Outcomes:

*Develops ideas and theories by actively exploring real-world problems.

* Identifies key issues that clarify different perspectives and lead to better solutions.

*Consciously manages the design process to generate ideas, test theories, create innovative works, or solve real problems.

*Explains his thoughts and research results.

*Applies engineering approaches to specific problems.

*Prepares the prototype of the product.

Outputs from other STEAM disciplines

Science

*Shows and explains foods on the chart

*Explain the relationship between living things and their nutrient content.

*relates human health and balanced nutrition.

*Predicts the consequences of unhealthy diet.

*Creates a model for healthy eating.

*Designs mechanisms that will make it easier for people to move in daily life by taking advantage of the movement feature of living things.

*Develops coding skills that will enable algorithmic thinking.

Maths:

*Creates the necessary calorie calculation table for a healthy diet.

*Creates research questions that require data collection.

 *Collects or selects data, displaying data in frequency table and column chart according to their convenience.

Art:

*Transfers his ideas through design and drawing.

Music

*Creates a song about the subject with a sense of rhythm.

1.2.Social product outputs:

*Working as a team

*Communication,

*Ability to share problem and solution-oriented ideas,

*Fulfilling their duties and responsibilities,

*Ability to defend their ideas

*Presenting the product effectively,

 *Understanding the importance of cooperation and cooperation.

*Approaches problems from a new perspective.

*Combines feedback effectively.

 *To be able to listen to your friends without prejudice.

2. Materials Used: Cardboard**, Scissors, Glue** pictures ,Plate(food) Canva web2 tool ,Clementoni.doc ,crayons H5p

3. Resources

https://youtu.be/N7ydQJqubqk
obesity images
4th grade
fenchrome-
extension://efaidnbmnnnibpcajpcglclefindmkaj/https://turkarchpediatr.org/Content/files/sayilar/5/t(1).pdf kitabı

4. Learning Methods and Techniques

Methods:Problem-Based Learning,Argumentation-Based Learning,Project-Based Learning,Discussion,Question-Answer and Collaborative Working

Techniques: Brainstorming, Vision Development, Observation, collaboration

5. Groups Considered to be Formed During the Activity:

The following features were taken into consideration in the Groups created.
*Groups are made up of 10 people.
*It was noted that there was a homogeneous group in terms of level.
*Equal gender distribution was ensured.

6. Implementation Phase;

6.1 Preparation Phase:
Our student groups are formed
Group leader elected
A clerk is chosen

6.2: Presenting the problem situation to the student:
    4th grade student Yağız's parents work in a private company. They go to work early in the morning and return home late in the evening. Therefore, Yağız could not acquire the habit of regular eating; he turned to ready-made and high-calorie foods. As a result, he started to gain weight rapidly. The mother took Yağız to a

dietitian. Calculations were made with the body mass index for the determination of obesity and it was observed that Yağız was obese.
*What foods can cause Yağız to gain weight?
*What is obesity and how do we know if Yagiz is obese?

6.3: Obtaining Information (Leading Questions)

In order to find a solution to the problem, the teacher asks the students to think about the following questions, do research and write down the information they have learned. Students do their research on the subject in groups.

*It is asked to research and examine the food pyramid and it is asked how this pyramid is?
*The food groups are asked to be introduced, and they are asked what kind of foods they know.
*What foods should be taken for a balanced diet?
*Is a healthy diet important for a healthy life?
*What are the precautions that can be taken to avoid obesity?
*Is it important to exercise other than nutrition?

6.4: Idea Development

Determining the Requirements of the Problem;

Groups move on to the idea development stage. Each group shares their ideas with their groupmates in the light of the information they have acquired in the previous stage. In this section, they try to answer the question of what they might need to solve the problem.
The teacher transfers the theoretical knowledge to the students at this stage.

What is healthy eating?
    A healthy diet is a type of nutrition that contains all the nutrients in the amount that the person needs, and at the same time fully meets the amount of energy needed by the individual, and is suitable for maintaining the ideal weight.
Food groups to be taken:
carbohydrates
oils
Proteins
vitamins
minerals and water

    So, do we consume these food groups? (students rest)
    What happens when we don't get enough of these food groups?
  People need energy to survive and they obtain this energy from food. Calorie is a unit of energy. The nutritional value of foods is determined by calories. In cases of excessive intake and unbalanced nutrition, obesity occurs.
So what are these foods? (students rest)

Inactive life added to unhealthy nutrition is the cause of obesity. Movement is important in our daily life. Because the food taken turns into energy with movement. For this reason, exercise has an important place in our lives.
The essential elements for the prevention of obesity are healthy eating and exercise.

   At this stage, clementoni.doc robotic coding activities and find the right food activities are carried out in order to teach the students the important concepts of the subject in an effective and permanent way.

6.5: Product development:

Identifying Possible Solutions;

At this stage, groups of students identify possible solutions using the brainstorming technique. And writing takes notes.

We should not consume ready-made foods to combat obesity.
We must exercise daily.
We must have our daily meals on time.
We should get enough from every nutrient, not a one-way diet.
Choosing the Best Solution:
   The solutions proposed in the previous stage are evaluated in terms of their strengths and weaknesses, advantages and disadvantages, and the best solution is selected.
  At this stage, students are conscious of what their food and drinks are. In order to reinforce the subject, a food pyramid is made, a healthy nutrition program is taken by going to a dietician, and a sample meal plate is prepared in the classroom based on this program.

Making the Prototype:
Instructor:
   "Now you are scientists attending the conference on the fight against obesity. You are asked to solve a real problem seen in children. You are asked to research the measures that can be taken against obesity and determine the measures that can be taken. Let's observe obese people, what foods do they consume and what are the factors that cause them to be obese? Gather information about it. and create the data. You will find the way and solution for this. It's time to find solutions! Design and imagine!"
The class is divided into three groups.

GROUP 1: DESIGN A DIGITAL POSTER ABOUT FOOD
GROUP2. A DIGITAL POSTER ATTRACTING OBESITY IS PREPARED
GROUP3: A POSTER OF PHYSICAL ACTIVITY IS PREPARED.

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6.6. Sharing and Reflections

The shares envisaged by the students are taken into account. From the beginning of this process, feedback is received on the areas where they have developed themselves, learned and focused in line with their interests and abilities.
What scientific concepts did you learn and apply in these activities?
What engineering skills did you learn and apply in these activities?
Did you acquire an artistic skill in these activities?
What creative ideas do you have that you need to research and develop more in these activities?

- ## 6.7. Evaluation:

Ask Research Questions. The instructor observes the students throughout the process, prepares questions or rubrics to evaluate the students' understanding of the subject and group work throughout the process.
Demonstrates the evaluation work with the H5P application.

LESSON PLAN 6 • Movement properties of assets

LESSON PLAN 6: Movement properties of assets

LESSON: Science
Subject: Movement properties of assets
Class: 3 (9-10 years old)
Duration: 240 minutes (6 lesson hours)

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1. Target Outcomes:
Cognitive Process Outcomes:
 Central discipline Outcomes**:**
*Observes the motion properties of assets.

*Classifies objects according to their movements.

*It reports the different movements it observes.

*He/she shares the report he/she has created verbally and in writing.

Outputs from other STEAM disciplines:

Maths:

• Collects or selects data on research questions; displays data in frequency table and column chart according to their convenience.

Art:

*Transfers his ideas through design and drawing.

*Prepares a poster with images suitable for the movement characteristics of assets.

1.2. Social Product Results:

• Working as a team,

• Communication,

• Ability to share problem and solution-oriented ideas,

• Fulfilling their duties and responsibilities,

*Ability to argue, defend ideas,

• Presenting the product effectively,

• Understanding the importance of collaboration

2. Materials Used:

- Rope ,ping pong ball
- 1 pet bottle, 4 caps, 2 skewers and 1 rubber band
- Interactive Board, tablet, internet connection

3. Resources

4.Learning Methods and Techniques

Problem Based Learning Method,
Argumentation-Based Learning Method
Project Based Learning Method
techniques; Brainstorming, collaborating, discussing

5. Groups Considered to be Formed During the Activity:

> The groups planned to be formed should be included in this section;
> The following features should be considered in the Groups created.
> *Groups must consist of 4 people.
> *It should be noted that it is a homogeneous group in terms of level.
> * Gender distribution should be equal.

---

6. Implementation Phase;
6.1 Preparation Phase:

Create your student groups.
Choose your group leader

6.2: Presenting the problem situation to the student:
One day, Begüm goes to the playground with her father. She meets her new friends in the park and swings on the swing with her friends.

What affects the rapid swing or slowdown of Begüm?
What's keeping you from flying all the way to the top of the swing set?

6.3: Obtaining Information (Leading Questions)
> In order to find a solution to the problem, the teacher asks the students to think about the following questions, do research and write down the information they have learned. Students do their research on the subject in groups.
> Do you know Newton's first law of motion?
> Why might movement matter to engineers?
> How does movement occur and what affects movement?

6.4: Idea Development

Determining the Requirements of the Problem;

- Groups move on to the idea development stage. Each group shares their ideas with their groupmates in the light of the information they have acquired in the previous stage. In this section, they try to answer the question of what they might need to solve the problem.

- The trainer gives theoretical knowledge.

- Many beings around us move.

Movement Feature of Living Things: Humans and animals can move according to their own will. The movement of plants is limited. Plants move towards the sun with their leaves and branches and towards the water under the ground with their roots.

Movement Feature of Inanimate Entities: Inanimate beings (vehicles, roads, mountains, buildings, objects…) cannot move according to their own will. In order for inanimate objects to move, an effect must be made by another being to set them in motion. In order for the car to move, it must be used. In order for the ball to move, it must be hit.

Newton's first law of motion defines the concept of inertia: an object at rest remains at rest and an object in motion remains in motion unless acted upon by an external force. A stationary object remains at rest and a moving object remains in motion unless there is an external force to change it. So, when you first sit on a swing, you are an inert object. And you continue to rest until you push off the ground and pump your legs. When you move, you don't have to do much work because an object in motion stays in motion. It is gravity that keeps you from flying all the way to the top of the swing set.
It is inertia that pulls you back in the other direction (forward or backward). Movement is the displacement process that pulls you back and forth, right and left, in the other direction, with the effect of an external force. There are some types of movements that we encounter in daily life. These are: Acceleration Movement, Rotation Movement, Swinging Movement, Deceleration Movement, Direction Changing Movement

How can we give examples of these in daily life? (Answers are received from students and feedback is provided.) Here, the instructor distributes the pictures that he has prepared beforehand to the students. (Appendix 1) He asks the students to interpret the pictures and to group them according to their movement patterns.

6.5: Product Development:
  Identifying Possible Solutions;
At this stage, groups of students identify possible solutions using the brainstorming technique. Solutions are noted.
   Choosing the Best Solution:
*Form groups of two.
*Tie one end of the yarn to the ping pong ball.
*The thread is fixed with tape so that it does not unravel.
*Holding the other end of the thread, hang the ping pong ball down.
 *We observe the ping pong ball by moving our hand to the right.
*The movement characteristic of the ping pong ball is determined.
*A data table is created. Evaluation studies are carried out. At this stage, it is recommended to use the argumentation method. The most appropriate solution proposal is determined by the students through in-group discussions. The

teacher can guide students to consider their time, costs, advantages and disadvantages when choosing the best solution.

Construction of the prototype:

- Together with the learner, the trainer designs a car with 1 plastic bottle, 4 caps, 2 skewers and 1 rubber band. (Engineering work is done).

- Then he/she asks the students the question: How can we increase the movement of the car he designed?

- With various trials (thickening the tire, designing an object that will provide more thrust, changing the ground and making changes in the size of the tires) the effect of the force on the movement and the types of movement are discovered.

6.6. Sharing and reflections

From the beginning of this process, feedback is received on how students develop themselves and learn in line with their interests and abilities. Students discuss learned scientific terms and engineering skills with their peers.

6.7 Evaluation:

Engineers use the force-motion relationship when designing many things. For example, engineers carefully consider how much a building can safely withstand swaying back and forth during a wind storm, using force-motion relationships to measure earthquakes (seismometers) and determine how much local gravity is (gravimetry) at any point on Earth. What does he use the force-motion relationship while designing? The instructor gives the students a research project and asks them to prepare a portfolio file. During the process, the students are evaluated. The students present their work.

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LESSON PLAN 7

- Demonstrative experiment "Lifting some bodies with the help of oxygen molecules from mineral water"

LESSON PLAN7 : Demonstrative experiment

Lesson: "Experience STEM through reading"
Subject: demonstrative experiment "Lifting some bodies with the help of oxygen molecules from mineral water"
Grade: 10 years
Duration: 40 minutes
Lesson plan drafted by teacher: Mirela Elena Vasilică

1. Target Outcomes:
- name and handle laboratory equipment
- to explain why some bodies float or sink in water.
- to work in a team on the stages of the experiment
Cognitive Process Outcomes:
The outcomes of the center discipline:
-to operate with scientific notions (bodies, density, particles, mass of a body)
- to justify the difference between the phenomenon of floating and that of submersion of bodies in water.
Outcomes of other STEAM disciplines:
Biology:
- the description of some natural environments in which the phenomena of bodies floating/immersing in water are observed
Physics:
- explanation of some terms: density, floating, sinking, mass of bodies
- knowledge of Archimedes' laws
-identification of some applications of floating bodies
Mathematics:
- the use of measurement units for carrying out experiments
Art:
-watching an artistic thematic film "Bathing".
-making paper boats
1.2. Social Product Outcomes:
• Working in a team: students are grouped in mixed teams of 4 students, each team includes children with SEN or girls.

• Communicating: students communicate with each other, listen to each other's ideas.

• Being able to share problem and solution-oriented ideas: students communicate both within the teams about the stages and work procedures, then compare the results obtained between the teams

• Fulfilling their duties and responsibilities: work tasks are explained and demonstrated in advance

• Being able to defend their ideas: the expression of students' opinions, acceptance of ideas and solutions offered is encouraged.

• Presenting the product effectively: students present the result of their experiment within the work team.

• Understanding the importance of cooperation and collaboration: students are encouraged to work in teams, to communicate with each other, to support each other for the creation of the product and its presentation.

2. Materials Used:

Mineral water, beans, vessels for experiment, laptop, internet connection, video projector, book Memories from childhood, author Ion Creanga, white paper.

3. Resources

https://www.youtube.com/watch?v=pQU1Fp5OxTU – artistic thematic film,,Bathing''
https://www.youtube.com/watch?v=Fe86P33nDvM – educational film with thematic experiments
https://www.youtube.com/watch?v=73tdaw1jB8U – educational film about floating ships

4. Learning Methods and Techniques

Brainstorming, demonstration, argumentation, experiment, learning by discovery, teamwork.

5. Groups Considered to be Formed During the Activity:

The distribution of students is done equally. The students are organized into mixed teams of 4 members each, with at least one girl in each team. There are also teams with students with special educational needs.

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6. Implementation Phase;

6.1 Preparation Phase:

The mixed work teams are formed, the responsibilities within the teams are established (the leader, the reporter

6.2: Presenting the problem situation to the student :

-reading the fragment Bathed from Childhood Memories.

Discussion Network: Why was the boy able to float in the water? Do you know other bodies that float or sink in water?

- announcing the topic of the activity: carrying out an experiment about floating / submerging bodies in water.

6.3: Obtaining Information (Leading Questions)

-students receive the working materials (mineral water, some beans), follow the explanations and carry out the experiment.

- during the activity, students are encouraged to communicate with each other, collaborate and ask questions for further explanations and feedback

6.4: Idea Development

-during the experiment, students write down their recorded observations, learn about the differences in floating or sinking bodies in water.

6.5: Product Development:

Students make arguments for applications of bodies floating in water: icebergs, sinking of the Titanic, floating of logs on water, sinking of submarines.

Making the Prototype: making paper boats, arguing through experiment how to check the freshness of an egg.

6.6. Sharing and Mirroring

- the activity is dynamic, students work in teams, learn to collaborate, communicate the results of the experiment.

6.7 Evaluation:

- the students learned to work in a team, to respect the stages of an experiment, to argue why a body floats or sinks in water, to recognize the applications of these phenomena in immediate reality.

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LESSON PLAN 8

- Microscopic observation of a microscopic preparation / Scientific experiment

LESSON PLAN 8: Microscopic observation of a microscopic preparation

Lesson: A world on a microscope slide
Subject: Microscopic observation of a microscopic preparation / Scientific experiment
Grade: 10 years
Duration: 50 minute
Lesson plan drafted by teacher: Mirela - Elena Vasilică

1. Target Outcomes:
- developing the skills of handling small things, through play.
- encouraging curiosity and experimentation
Cognitive Process Outcomes:
-to operate with scientific notions (instrument, lens, microscope, laboratory equipment, laboratory preparation, pipette, knife)
- to describe the working stages of an experiment
The outcomes of the center discipline:
- familiarization with the components of a microscope
- making microscopic preparations
Outcomes of other STEAM disciplines:
Biology: Identifying ways to protect the environment.
Physics: Locating objects in space and symbols in various representations;
Mathematics: he use of standardized tools and units of measurement, in concrete situations
Art: The creation of unique, personalized and usable products in the future carrying out predominantly manual, creative and playful activities.
Making a puzzle with the image of a microscope
1.2. Social Product Outcomes:
• Working in a team: the students are grouped in mixed teams of 5 students each, in each team there are also children with disabilities.
 • Communicating: students discuss with each other, share ideas
 • Being able to share problem and solution-oriented ideas: the teams about the stages and work procedures, then compare the results obtained between the teams
 • Fulfilling their duties and responsibilities: work tasks are announced, the time allotted.
 • Being able to defend their ideas: deas and solutions offered is encouraged

• Presenting the product effectively: the students present their preparation obtained for miroscopic analysis, describe its characteristics.

• Understanding the importance of cooperation and collaboration: students are encouraged to work in teams, to communicate with each other, to support each other for the creation of the product and its presentation.

2. Materials Used:

Laboratory equipment (microscope, slides, knife)
Materials for making the preparation (aloe leaves)
Observation sheets
Puzzle pieces
Worksheets

3. Resources

Educational videos about the construction and role of a microscope
https://www.youtube.com/watch?v=SanEzlLGBaE
https://www.youtube.com/watch?v=aZLhxeIR2tM

4. Learning Methods and Techniques

Learning by discovery, problem solving, brainstorming, the project, the demonstration

5. Groups Considered to be Formed During the Activity:

The students are organized into mixed teams of 5 members each, with at least one girl in each team. There are also teams with students with special educational needs

6. Implementation Phase;

6.1 Preparation Phase: the mixed work teams are formed, the responsibilities within the teams are established (the leader, the reporter).

6.2: Presenting the problem situation to the student :
-watching educational films about the microscope.
- announcing the topic of the activity: making a biological preparation that will be analyzed under a microscope.

6.3: Obtaining Information (Leading Questions)
-students receive the work materials, follow the explanations and start making the preparation for the microscope
- during the activity, students are encouraged to communicate with each other, collaborate and formulate questions for further explanations and feedback.

6.4: Idea Development

- the students are curious to analyze the obtained preparation under a microscope, learn to use the microscope, write down the observations on the workshe

6.5: Product Development:
-students compare the quality of the microscopic preparations made by the other teams, describe the work steps and the materials used.
- students identify possible causes for some unsuccessful microscopic preparations-

Making the Prototype:
- students make a puzzle to get the image of a microscope.
- math problems with simple addition operations, using terms about laboratory equipment

6.6. Sharing and Mirroring:
the activity is dynamic, students work in teams, learn to collaborate

6.7 Evaluation:

-students made microscopic preparations with the help of laboratory equipment
-students learned to use laboratory equipment
-students learned to name the stages of the experimental activity.

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LESSON PLAN 9

• Elements of plastic language

LESSON PLAN 9: Elements of plastic language

Lesson: Arts
Subject: Elements of plastic language. The plastic composition that shows the decorative and constructive role of the line - strengthening skills and abilities
Grade: 9-11 years - 3rd grade, 4th grade
Duration: 1 hour
Lesson plan drafted by teacher: Nicoleta Jora

1. Target Outcomes:
Cognitive Process Outcomes:
The outcomes of the center discipline: Understanding the role of plastic language elements in everyday life, but also in the world of art
Outcomes of other STEAM disciplines:
AVAP (Visual Arts and Practical Skills):
Obj1. to identify the line as a decorative element in plastic or practical compositions;
Obj2. to define the line as a plastic element;
Obj3. to classify the lines according to their shape, thickness or position on the plastic space;
Obj4. to recognize the role of the line in the decorative composition;
Obj5. to be able to compare the lines with each other, as well as the groups formed by them;
Obj6. to know procedures specific to the art of decoration (repetition, alternation, symmetry, asymmetry);
Obj7. to make plastic compositions with the decorative element line.
Language:
Obj8. to retain details from the story for an original decoration;

1.2. Social Product Outcomes:
• Working in a team,
• Communicating,
• Being able to share problem and solution-oriented ideas,
• Fulfilling their duties and responsibilities,
• Being able to defend their ideas,

• Presenting the product effectively,
• Understanding the importance of cooperation and collaboration .

2. Materials Used:

boards, wooden border in which the images are presented, cards, white sheets, mats, ii, Romanian ceramics, wooden objects, chalk, video projector, laptop, ppt.

3. Resources

- **„Programa școlară pentru clasa a III-a", Ministerul Educației și Cercetării, București, 2004**
- **"Ghidul de educație plastică", E.D.P., Susala, Ion ; Dicționar plastic", Sigma, 1990;**
- ******Programa școlară pentru clasa a IV-a, Ministerul Educației și Cercetării, București, 2005**
- **Susala, Ion "Ghidul de educatie plastica E.D.P. „Dicționar plastic",Sigma,1990;**
- **https://www.youtube.com/watch?v=IQ10eolcSxs**

4. Learning Methods and Techniques

integrated approach / exercise, conversation, story, problematization, explanation, didactic game;

5. Groups Considered to be Formed During the Activity:

individual, frontal, mixed groups of 5-6 students, in pairs

6. Implementation Phase;

6.1 Preparation Phase:
To relax the atmosphere and to develop divergent thinking, the game "Office paper clip" is proposed to the students. Give them each a paper clip and ask them to imagine that they only have paper clips and find, within 60 seconds, another use for it, as clever as possible, which they will write down. Students listen to the proposal made. They think and list as many uses of it as possible.

6.2: Presenting the problem situation to the student :
Ask the students what the line is, what are its roles and why it was and is used as a decorative element? Encourage children to give examples of the constructive role of the line. The students specify the checked notions: the line used as a decorative element.
I define the line, as a plastic element, specifying its roles. Exemplify.
The students are asked to list the types of lines they know, according to certain criteria, and to identify them in the works and objects exhibited by them during the week.

Lists, according to certain criteria, the known line types. He identifies them in the exhibition of works and objects brought by them.

The principles of decorative art are listed and the children are asked to explain each principle. Explains alternation, symmetry, repetition and overlap, as decorative principles, through his own expression.

6.3: Obtaining Information (Leading Questions)
Let's use the line as an artistic element to beautify the surrounding things!

6.4: Idea Development
1. I present to the students a **story** by Constanța Nițescu, entitled "*The Sparrow and the Swallow*".

The students are asked to say what the two birds represent, in stories or in popular belief.

Attention is drawn to the frame in which the story is presented.

The students characterize the swallow as a hardworking bird, a symbol of spring, and the sparrow as being very resistant to harsh living conditions.

Notice the border.

2. **Intuition of the model:** I present the model work and ask the students to observe the use of the line in decorating the border. Each student is given 2 pieces of plush wire with which they are asked to construct a viewfinder/photo lens through which to look around. The importance of narrowing the field of view by this method is discussed.

3. **Demonstration of the work procedure:** On a block sheet I will demonstrate the decoration of the border, using various working techniques (carioca, using the pencil, brush, brush handle) to obtain the line in a continuous duct or not.

Then I make the portrait starting from the chosen pattern. The portrait is pasted in the center of the frame, completing the work in the form of a painting. I verbalize the actions, I encourage the students to use different colors in their work.

4. **Intuition of working conditions:** Attention is paid to the students on the realization of the work, using the line, as a decorative element, in all its forms. I present the evaluation criteria that must be respected in the creation of plastic compositions.

The students are shown 2 papers, one in which the evaluation criteria are respected (observance of the work stages, neat appearance, completion of the work in the given time, respect of the given theme), and the other without any of the criteria being respected. The 2 works are compared according to each displayed criterion. Arguments are made in favor of meeting the criteria.

5. **Completion of works by students**
    I supervise the children, following:
*the way of composing the plastic space;
*the use of the line, as a decoration element;
*compliance with the rules for the correct organization of plastic elements in the composition

*fitting in the page, proportion, compositional balance, harmony;
   I help where appropriate, intervene with explanations or warnings.
The works are displayed and analyzed freely by the children.

6. It ends **transdisciplinar**y with the enumeration of the elements that make up the border(s) of Romania. Together with the students, we look for symbols for the landforms that form Romania's borders, but also for the conventional border

6.5: Identifying Needs for the Problem;

1. There are unbreakable boards, a wooden border in which they are presented, video projector, laptop for observing other border models.
2. Every student needs the plush wire and its use as a lens to focus attention on the targeted items.
3. Each student will need a drawing board, and painting/drawing tools. They will learn techniques for decorating objects, using the line as an element of plastic language.
4. Observation and argumentation are the processes followed here, used for the analysis of the 2 papers presented.
5. Students will use the tools present in a painting lesson and the skills of a budding little artist.
6. Work will be done on the physical map of Romania, but also on geographical atlases. The proposed symbols will be made on the blackboard and on post-its - by the students.

6.6: Product Development:

1. Each student will remember details from the story heard.
2. Each student will make a photo lens to focus the desired image
3. Each student will learn new plastic techniques, which they will practice through drawing.
4. Students will analyze 2 papers, learning to argue for and against compliance with the given criteria.
5. Each student will make a plastic work.
6. Students will work with the map, analyzing Romania's borders. They will propose symbols for the types of boundaries.

6.7. Sharing and Mirroring

1. Students will debrief the story, list symbols of spring and set elements made up of lines.
2. Students will compare the photo lenses made and their originality.
3. Students remember techniques for creating a border, but also a portrait/self-portrait, as ways of spending free time.
4. Students remember the criteria for analyzing a work of art, adding others of importance for their vision as an artist.
5. They will analyze the work of their colleagues, developing their analytical and argumentative skills

6.8. Evaluation:

An oral evaluation of the completed works is carried out.
It follows:
~ respecting the theme and the subject;
~ the most varied use of the line, as a decorative element;
~the richness and meaning of colors;
~ creativity, originality

LESSON PLAN 10

• The dinosaurs - knowledge consolidation

LESSON PLAN 10: The dinosaurs - knowledge consolidation

Lesson: Arts
Subject: The dinosaurs - knowledge consolidation
Grade: 6-8 years - preparatory class, first class, second class
Duration: 5 hours
Lesson plan drafted by teacher: Nicoleta Jora

1. Target Outcomes:
Cognitive Process Outcomes:
The outcomes of the center discipline: Developing creativity and artistic skills, starting from existing knowledge about dinosaurs
Outcomes of other STEAM disciplines:
Exploring the Environment:
Obj1. to describe the appearance of a dinosaur, of your choice, from those presented in the exhibited plates;
Obj2. to compare the different species of dinosaurs according to the established indicators;
Obj.3 to recognize dinosaur fossils, among those presented by his colleagues;
Language:
Obj4. to know stories about dinosaurs;
Obj5. to create another epic thread, starting from the dinosaurs drawn on the cardboard cube;
Personal Development:
Obj6. to identify with a dinosaur species, explaining the choice made

Music:
Obj7. imitate dinosaur movements to the featured song;
Visual Arts and Practical Skills:
Obj8. build dinosaur skeletons using ear sticks;
Obj.9 to use water and dinosaur parts in the construction of frozen dinosaur eggs.

1.2. Social Product Outcomes:
• Working in a team,
 • Communicating,
 • Being able to share problem and solution-oriented ideas,
• Fulfilling their duties and responsibilities,
• Being able to defend their ideas,
• Presenting the product effectively,
• Understanding the importance of cooperation and collaboration .

2. Materials Used:

laptop, video projector, plastic figures, ear sticks, water, plastic bowls, freezer, cardboard, glue, boards, dinosaur tokens, internet.

3. Resources

- **https://www.twinkl.ro/search?q=dinozauri&c=176&ca=156&ct=ks1&r=teacher&fco=25867**
- **https://ro.pinterest.com/pin/7318418136657684/**
- **https://infanity.es/metodo-stem-beneficios/**
- **https://www.fabisantiago.co.uk/activities**

4. Learning Methods and Techniques

integrated approach / conversation, story, exercise, game, problem solving, explanation, listening, systematic observation, 5-minute essay or drawing

5. Groups Considered to be Formed During the Activity:

individual, frontal, mixed groups of 5-6 students, in pairs

6. Implementation Phase;

6.1 Preparation Phase:
The "*Morning Meeting*" is held, in which the students will have 3 minutes to find one or more partners who know the same dinosaur story by shouting BINGO!. They will stay in groups or alone, depending on the story they have come up with - if it is known to other colleagues. Each team will have the first 5 minutes of each class hour to tell us, in short, their story with dinosaurs. Storytellers will be applauded. Each story will be drawn, at the end, on A3 sheets, displayed on the walls. Students who presented their story by themselves can get help in drawing from other

classmates. These will make a book with stories about dinosaurs, for the class: *We're a Dinosaur Storybook.*

6.2: Presenting the problem situation to the student :
Starting from the students' knowledge about dinosaurs, the teacher will present the students with the idea of "playing" with them, through the prism of the arts: music, plastic education, but also literary creation.

6.3: Obtaining Information (Leading Questions)
Let's imagine that we are artists trying to immortalize dinosaurs through their works of art!

6.4: Idea Development

1. *Our Dino-Story:* Pupils will be presented with a larger cube, which will have an image of a cartoon dinosaur on each face. They will be tasked with creating a story with these characters. They will work in pairs. The chosen pair will roll the die and introduce the character highlighted by the die into the story, even if it was already owned by a previous pair. Dino-storytellers will receive a badge as a prize.

The story will be introduced into the previously created dinosaur storybook.

2. *How is one, how is another?* They will work in pairs. Each pair will receive a board with a printed dinosaur. They will receive ear sticks with which they will have to make up its skeleton by gluing. They will work according to a model presented. The boards will be exposed. Each pair will present their dinosaur by comparing it to another dinosaur of their choice. Reference will be made to name, height, mode of feeding, reproduction, etc. The boards will respect the height, weight, color indices, on a much smaller scale.

3. *Recognize the fossil!*: Students will work with plasticine but also with small animal figurines, including dinosaurs. They will form plasticine circles, on which, by pressing, they will print the profile of the animal, creating an exhibition of fossils. At the end, using the Gallery Tour method, students will recognize the origin of the fossils, naming the respective animal.

4. *If I were...!* Under the pretext of going back in time, students are presented with a board with the most famous dinosaur species. They will be asked to think carefully about their characteristics and choose the species with which each one identifies, arguing, in turn, the choice made..

5. *Dinosaur Song:* Students will learn the lyrics and melody as they each cut out the dinosaur from the handout, cut along the mouth straight, then glue the dinosaur's "lips" to the closing sides of a clothespin, imitating , by pressing the hook, the movement of the prehistoric animal's mouth.

At the end, the whole song will be sung, imitating the dinosaurs through movements or using the built marionettes.

6.5: Identifying Needs for the Problem;

1. A larger cube will be used, with a picture of a cartoon dinosaur glued on each side. Emphasis will be placed on creativity and the narrative flow of the created story, on students' attention and their collaboration in working in pairs.
2. You need cardboard sheets, ear sticks, plastic glue, model work and pictures of the skeletons of different species of dinosaurs. It also takes skill and attention, as well as correct expression, to characterize each type of dinosaur chosen for work..
3. It takes plasticine, modeling skills, attention and observation to recognize the dinosaur species to which each fossil belongs.
4. Boards with different species of dinosaurs and reasoning are used as a method of critical thinking.
5. You will need clothespins and sheets printed with different species of dinosaurs, scissors and glue. The aim is to develop the skills of working with paper and making toys using the materials at hand.

6.5: Product Development:

1. A class story about dinosaurs will be created.
2. Each pair of students will create a dinosaur skeleton on a sheet of cardboard.
3. Each student will create several dinosaur fossils based on the plastic figures they have on hand.
4. Se vor obţine argumente în favoarea unei anumite specii de dinozauri, în funcţie de caracteristicile acestora.
5. Each student will make a cut-out dinosaur puppet toy.

6.6. Sharing and Mirroring

1. Students will practice creating their own stories, based on the given images.
2. Each student will become aware of the role of the skeleton in the locomotion of every living thing, but also in gathering information about extinct species.
3. The importance of the profession of archaeologist will also be highlighted here, as well as the qualities it must have.
4. The student will learn to argue each opinion, with elements selected from the knowledge he has acquired.
5. Students will compare the obtained toys, imitate the sounds made by dinosaurs, sing the learned song in unison.

6.7 Evaluation:

It will be done by the Essay/drawing method (for those in the preparatory class) of 5 minutes, in which the students will have to say/draw what they liked most about the things they learned about dinosaurs. The activity will conclude by

creating frozen dinosaur eggs, highlighting the importance of archaeologists' work to our understanding of the planet we live on. Each student will have a round bowl, in which they will place a dinosaur figure, put water and put it in the freezer. There will be discussions on the role of cold in preserving traces of past life and on the work of an archaeologist.

LESSON PLAN 11	• Friendship. "The Smartest Giant in Town" by Julia Donaldson

LESSON PLAN 11: Friendship. "The Smartest Giant in Town" by Julia Donaldson

Lesson: Technology
Subject: Friendship. "The Smartest Giant in Town" by Julia Donaldson
Grade: 6-7 years - preparatory class
Duration: 1 hour
Lesson plan drafted by teacher: Nicoleta Jora

1. Target Outcomes:
Cognitive Process Outcomes:
The outcomes of the center discipline: to help the animals in the story, as alternatives to the support given by the giant, by building with LEGO pieces;
Outcomes of other STEAM disciplines:
Language:
Obj1. to reproduce the details of the story heard, with the help of the questions asked;
Obj2. to characterize the chosen character, using the appropriate marionette;
Obj3. build a map of the giant's city based on places in the story using ozobots;
Mathematics:
Obj4. to find the similarities between the sailboat and the parachute, in terms of their movement;
Obj5. associate the heard number with the corresponding digit;
Personal Development:
Obj6. to choose a way to help someone during the current day through the game "I'm cool too!";
Music:
Obj7. to compose songs for the giant's lines in the story with the help of a homemade sound amplifier, in the game "Sing fines";
1.2. Social Product Outcomes:

- Working in a team,
- Communicating,
- Being able to share problem and solution-oriented ideas,
- Fulfilling their duties and responsibilities,
- Being able to defend their ideas,
- Presenting the product effectively,
- Understanding the importance of cooperation and collaboration .

2. Materials Used:

laptop, video projector, cardboard puppets, ozobots, A5 cardboard sheets, markers, number cards, cardboard cups, adhesive tape, LEGO pieces, internet.

3. Resources

- **https://infinit-edu.ro/wp-content/uploads/2021/05/Cel-mai-fain-urias_activitati.pdf**
- **https://infinit-edu.ro/2021/cel-mai-fain-urias/**
- **https://www.twinkl.ro/search?q=smartest+giant+in+town&c=244&r=parent**
- **https://www.teachingideas.co.uk/library/books/the-smartest-giant-in-town?fbclid=IwAR212I8UlTruJZYKUnZMLv7IqVMKr0coy96HLdJc9NyS0ygO0Z7aBYmRurk**
- **https://momgineer.blogspot.com/2018/02/simple-stem-with-plastic-cups.html**

4. Learning Methods and Techniques

integrated approach / conversation, storytelling, exercise, game, problem solving, explanation, listening, systematic observation

5. Groups Considered to be Formed During the Activity:

mixed groups of 5-6 students

6. Implementation Phase;

6.1 Preparation Phase:
The students are divided into groups already, in the Step by Step classes. This is the way it works, all the time. Each one has, in turn, the role of leader or reporter.

6.2: Presenting the problem situation to the student :
Listening to the story: Students will watch the story on the video projector, carefully. Students are encouraged to pay attention to the story in order to find solutions later.

6.3: Obtaining Information (Leading Questions)
1. Let's build a parachute to help the goat in the story!

2. Let's make a map to help the animals find their way home!
3. Let's change the story!
4. Let's create a song for the characters in the story!

6.4: Idea Development

1. Question-based storytelling, followed by characterisation: comprehension of the story will be checked by asking questions based on the content heard, using, through play, puppets with characters from "The Coolest Giant in Town". Finally, they will build each puppet a parachute, using thread and a tissue paper.
2. Drawing up a map, based on the locations in the story, and retelling it with the help of ozobots: the students will work in groups, on an A5 sheet, on which they will have to make a map of the places where George the Giant walked.
3. Associating the heard numbers with the corresponding digits: the teacher will tell a version of the story, in which he will enter the learned numbers, from 0 to 10. The students who have the card with that number will have to repeat the number out loud, showing the card to their classmates.
4. Using the game "Sing the tunes", children will have to find a song that matches the lyrics of the giant, having memorized 4 of them. We will build sound amplifiers by gluing two cardboard glasses to the bottom of them, after drilling holes in the bottom of the glass.

6.5: Identifying Needs for the Problem;

1. We need building materials. We will have puppets made of cardboard, thread, tissue paper.
2. Establishing story locations and presenting work materials: A5 sheets, markers, ozobots.
3. Identifying numbers slipped into the original story.
4. We need speakers for our song.

6.5: Product Development:

1. Each team will make their own parachute, given the given materials.
2. Each team draws up a map to work on the story with the ozobots.
3. A mathematical version of the story.
4. Sound amplifiers built from recyclable materials

6.6. Sharing and Mirroring

1. We will release the parachutes from the window, following their trajectories, safely. We will establish the similarities with the goat's sailboat in the story.
2. Then they will check the route with the help of ozobots and report back.
3. Creating other similar variants by introducing mathematical elements into the story.
4. The obtained products will be tested for each team.

6.7 Evaluation:

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Students will have to explain the title of the story. Then the game "Who's cool?" is proposed. Each student will have to choose a person from the class and say that he is cool because..., complimenting the classmate on one of his qualities.

LESSON PLAN 12

- Summer. "Heidi, the mountain girl" - by Johanna Spyri - knowledge consolidation

LESSON PLAN 12 : Summer. "Heidi, the mountain girl"

Lesson: Literature

Subject: Summer. "Heidi, the mountain girl" - by Johanna Spyri - knowledge consolidation

Grade: 9, 10, 11 years - 3rd grade, 4th grade

Duration: 1 hour

Lesson plan drafted by teacher: Nicoleta Jora

1. Target Outcomes:

Cognitive Process Outcomes:

The outcomes of the center discipline: enriching the literary universe with classic works and understanding the importance of spending free time in nature

Outcomes of other STEAM disciplines:

Language:
Obj1. read a known text correctly, coherently and expressively;
Obj2. to answer orally the questions regarding the form and content of the text;
Obj3. to delimit the text into logical fragments;

Obj4. to formulate orally, as well as in writing, the main ideas of each individual fragment;

Obj5. to narrate the read text orally, using the idea plan;

Personal Development:

Obj6. to find solutions to help a disabled person;

Music:

Obj.7 to reproduce sounds from nature using elements found in the garden in the school yard.

1.2. Social Product Outcomes:

• Working in a team,

 • Communicating,

 • Being able to share problem and solution-oriented ideas,

• Fulfilling their duties and responsibilities,

• Being able to defend their ideas,

• Presenting the product effectively,

• Understanding the importance of cooperation and collaboration .

2. Materials Used:

boards, ppt, video projector, laptop, worksheets, textbook, pencil, board with the Summer Fairy, tokens with activities specific to the summer season, board with biographical data and the author's portrait, worksheets, Romanian language manual, 6 hats, diplomas, tape recorder, patafix, markers, flipchart sheet, tokens with known trades.

3. Resources

- Consiliul Național pentru Curriculum – „Programe şcolare pentru clasa a III-a",
- Limba şi literatura română – Manual pentru clasa a III-a, Editura Aramis,
- Carmen Iordăchescu, Să dezlegăm taina textelor literare – clasa a III-a, Editura Carminis, Piteşti, 2002
- Consiliul Național pentru Curriculum, Curriculum național. Programe şcolare pentru învăţământul primar, Bucureşti, 1998
- Elena Miţoi, Mariana Volintiru, Metodica predării limbii şi literaturii române în învăţământul primar, Editura Fundaţiei Humanitas, Bucureşti, 2001
- Consiliul Național pentru Curriculum, Ghid metodologic pentru aplicarea programelor de limba şi literatura română – învăţământ primar şi gimnazial, C.N.C., Bucureşti, 2002

- Elena Joița, Didactica aplicată. Partea I – învățământul primar, Editura "Gheorghe Alexandru", Craiova, 1994
- ***, "Descriptori de performanță pentru învățământul primar", Editura Pognosis, 2001

4. Learning Methods and Techniques

integrated approach / linear reading, conversation, explanation, exercise, work with the manual, systematic observation, verbal appreciation, techniques for developing critical thinking;

5. Groups Considered to be Formed During the Activity:

mixed groups of 5-6 students

6. Implementation Phase;

6.1 Preparation Phase:
The students are divided into groups already, in the Step by Step classes. This is the way it works, all the time.
Propose *The curious insect* game to the students. He explains the rules of the game (the student who has the same insect or one of the same color must answer the question, and the neighboring insect - the colleague next to him - must formulate a question related to the content of the text) and quantitatively check the homework.
Qualitatively checks the theme, correcting any mistakes in expression, intonation or content.

6.2: Presenting the problem situation to the student :
Present some passages from the read text and ask the students to recognize the characters that correspond to them, placing them in a diorama, with the help of the students.
   It announces the theme of the lesson and its objectives, in a manner accessible to the students, inviting the students on an imaginary trip to the Alps area, among the multicolored flowers of the mountains.

6.3: Obtaining Information (Leading Questions)
Draws attention to active and interested participation in the lesson for working on the fragment from the literary work "Heid…i".

6.4: Idea Development
   1. Suggest students **read the text**:

- in a chain (The first child is given a ball of wool, He will read a statement and hand the ball to the next child, keeping the end throughout the reading. The next child will also hold the thread and so on until the text to be read is completed.)
- on roles (they will be given to the students who read clothing elements to more easily enter the respective role)
- selective.

2. Ask students to read in fragments, narrate them and extract **the main ideas**. It presents the working method for extracting the main ideas: depending on the color of the insect received.

- Yellow - read the fragment,
- Red - tells,
- Orange- formulates the main idea, in the form of a title,
- Pink- turns the title into a developed sentence,
- Blue - will help to tell the entire text, based on the plan of ideas.
  Write the ideas on the board.

3. It will guide students to participate in the full **text narration** with the help of ozobots. Students will be presented with the map of the text, with a circuit made with markers, for an ozobot to follow. During this time, each team will briefly narrate the read fragment, also taking into account the walking pace of the robot.

4. The students are proposed, transdisciplinary, the game I*f I were...*, in which they will have to choose a job and explain how they could help a child with disabilities, heal or make his life easier.

5. The activity ends in the garden in the school yard, where students are asked to **imitate sounds from nature** with the help of some natural elements found in the garden: sticks, leaves, stones, etc.

6.5: Identifying Needs for the Problem;

1. Students will need a ball of wool/chain, cards with the passage to read, distinctive elements for each character of the text.
2. Students will need insect tokens of different colors, notebooks, pens, blackboard, markers.
3. Students will need Ozobots, text map sheet.
4. Students will use tokens with known trades.
5. Students will use elements from the school garden: sticks, stones, leaves, etc.

6.6: Product Development:

1. Each student will participate in reading the text through different literacy methods to help develop reading skills.
2. Each team of students formed by the color of the received token insect will extract the main idea of a fragment from the read text.
3. Each team of students will tell a story using the text map and ozobots.
4. Each student will become aware of the importance of the chosen profession in the development of the community in which he lives.
5. Each student will use the elements of nature to create music.

6.7. Sharing and Mirroring

1. Students will become aware of the rhythm, clarity and expressiveness with which they read, as well as the fact that they are part of a collective where each develops at their own pace.
2. Students will extract the main idea, which must be related to the previous one.
3. The students of each team will narrate the read text against time, collaborating to follow the rhythm dictated by the ozobot.
4. Each student will choose a job and indicate an element specific to that profession, with which they can help those around them.
5. Each student will look for elements of nature with which they can imitate the musicality of nature.

6.8. Evaluation:

Retention and transfer assurance:

It is done by the "Thinking Hats" method, with the following roles:

WHITE HAT-THE NARRATOR

THE RED HAT-THE PSYCHOLOGIST

YELLOW HAT-THE OPTIMIST

THE BLUE HAT-THE MODERATOR

THE GREEN HAT-THE CREATIVE

THE BLACK HAT-NEGATIVIST

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LESSON PLAN 13

- ## Intuitive elements of geometry. The triangle

LESSON PLAN 13 : Intuitive elements of geometry. The triangle

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Lesson: Maths

Subject: Intuitive elements of geometry. The triangle

Grade: 10-11 years - 4th grade, 3rd grade

Duration: 1 hour

Lesson plan drafted by teacher: Nicoleta Jora

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1. Target Outcomes:

Cognitive Process Outcomes:

The outcomes of the center discipline: Knowing the characteristics of geometric shapes and using this knowledge in everyday life.

Outcomes of other STEAM disciplines:

Math:
Obj1. to recognize the triangle and other polygons, in various contexts;
Obj2. to identify the constituent elements of the triangle: sides, vertices, angles;
Obj3. to correctly use mathematical terminology (interior, exterior, figures, sides, angles, vertices, solids) in appropriate contexts;
Obj4. to build triangles of different sizes;
Obj5. calculate the perimeter of a polygon;
Obj6. to identify the main types of triangles: equilateral, right-angled, isosceles and equilateral;

Obj7. to intuit the solution of the problems of placing numbers, objects, figures, depending on the given requirement (one depending on the other).

1.2. Social Product Outcomes:

• Working in a team,

• Communicating,

• Being able to share problem and solution-oriented ideas,

• Fulfilling their duties and responsibilities,

• Being able to defend their ideas,

• Presenting the product effectively,

• Understanding the importance of cooperation and collaboration .

2. Materials Used:

laptop, video projector, boards, cards, Domino chips, white sheets, blackboard, chalk, Logi kit, internet, plastic sticks, carios, colored pencils.

3. Resources

- „ Didactica matematicii în învăţământul primar", Domniţeanu, P.-, Ed. Geneze, Galaţi, 2002
- „Programa scolară pentru clasele a III-a", Ministerul Educaţiei şi Cercetării, Bucureşti, 2004
- „Matematică", manual pentru clasa a III-a", Pacearcă, Şt., Mogoş, M.-, Ed. Aramis, Bucureşti, 2005
- http://www.materialeseducativosmaestras.com/2018/03/cuento-triangulo.html
- https://www.slideshare.net/InsomnioCrniko/domino-geometrico-40518681

4. Learning Methods and Techniques

integrated approach / exercise, observation, conversation, explanation, problem solving, independent work, didactic game, storytelling, the method of multiple intelligences

5. Groups Considered to be Formed During the Activity:

mixed groups of 5-6 students

6. Implementation Phase;

6.1 Preparation Phase:
Quantitative verification of the homework: Suggests the students to paste the cut-out polygons at home on the blackboard, in the indicated places, during which they quantitatively check the performance of the homework by the students.
Qualitative homework check: Selectively checks the correctness of homework.
Theoretical knowledge:
- What is the smallest geometric element?
- What is the shortest distance between two points?
- How many types of lines do we know?
- What forms a closed broken line?
- What polygons do you know? Give examples of objects with these shapes.
- What is the perimeter of a polygon? What about the line of symmetry?
Moment of mental calculation:
- addition and subtraction, multiplication and division exercises
-problem: A sports field consists of a square and a hexagon with equal sides. Knowing that each side is 11 meters, how many meters is the perimeter of the sports field?

6.2: Presenting the problem situation to the student :
Tell the students the Story of a Triangle, introducing them to the desired atmosphere.

6.3: Obtaining Information (Leading Questions)
Today you are each other's teachers, and you will have to help each other learn about the triangle.

6.4: Idea Development
Students are guided to solve learning tasks.
The students are divided into 5 groups of craftsmen. He will distribute an informative material to each of them and explain the necessity of reading it by each team.
Then each team will help to teach the lesson and to its understanding by all colleagues.

1. TEAM OF BUILDERS: He will draw, together with his colleagues, two points on the board, which he will join, forming a line segment. Then he will take a point far from the segment, which he will join with the other two, forming a triangle. The definition of the triangle is written. The triangle will be noted, like a polygon. He will ask the students to read the triangle. They will build with plastic sticks the same polygon, individually.

2. REPORTER TEAM: explain that the triangle is the polygon with the fewest sides, then ask the colleagues to look at the cut-out triangle at home and tell what elements they notice in this geometric shape. (sides, vertices, angles). It will read and write each element separately.

3. 3* ENGINEERING TEAM: Students will be shown different triangles, explaining that they can be of several types. Depending on the size of the sides, triangles can be equilateral, isosceles or equilateral. And the triangle that has a right angle is called a right triangle.
   The students in this team will solve a problem, in which they will have to form triangles, starting from the given points - see the appendix.

4. MATH TEAM: Ask students what the perimeter of a triangle is. Write the perimeter formula. It proposes to solve the problem of finding the perimeter.

5. TEAM OF ARTISTS: presents some curiosities about the triangle. Explain to the children that, over time, people have tried to beautify, by decorating, the surrounding objects, often using geometric figures. I also decorate the card I received, with triangles of all sizes and colors.

It concludes the way of teaching the little teachers, encouraging them to persevere in their attempt.

6.5: Identifying Needs for the Problem;
1. They will need blackboard, markers, notebooks, pens, plastic sticks. The students in the builders' team will explain the way of working so that the other colleagues proceed identically in using the sticks.
2. Triangles cut out of cardboard, notebooks and pens will be used. The team of reporters will compile a report about the characteristics of the triangle and defend it in front of their teammates.
3. Students will use the different types of triangles in the envelopes to construct and characterize them.
4. Students will use the formula for calculating the perimeter of a triangle and the triangle cut out of cardboard.
5. Students will use flashcards to read trivia about triangles, then decorate with triangle types the pictures they receive and display the work.

6.6. Product Development:
1. Each student will build different types of triangles.
2. Students will divide the triangle into component elements.
3. Students will become aware of and construct different types of triangles, highlighting the differences between them.

4. Students will remember the formula for finding the perimeter of a certain triangle and will practice finding the perimeter.
5. Students will use the triangle, as a geometric element, to decorate the received images/objects.

6.7. Sharing and Mirroring

The transfer of information is carried out through the game "Geometric Domino". Distribute one token with two figures/objects to the students. At the signal, the students will start placing the chips on the board, with magnets, forming pairs of geometric shapes.

6.8 Evaluation:

Propose to the students, cross-disciplinary, the game If today were..., explaining to the students that they will have to choose a geometric shape for the current day and explain the choice made.

Example: If today were a geometric shape, today would be a circle because it would always roll never ending.

Appendix
1 * BUILDERS TEAM:
To draw a triangle, you take two points, which you join and get a line segment. Then you take another point far from the segment and join it to the other two points. Thus you get a polygon with three sides. So what is the triangle? Write it down. Read it.
2* TEAM OF REPORTERS:
Did you know that the triangle is the polygon with the fewest sides?
Look at the triangle you cut out and show how many sides it has and what they are. Can you do the same with the one drawn on the board?
How many vertices does the triangle have? Which are these? Read them.
How many angles does it have? Which are these? Read them.
3* ENGINEERING TEAM:
Look at the triangles in the envelope. Do you see any difference? So triangles can be of several kinds:
a) equilateral triangle = the triangle that has all equal sides.
b) isosceles triangle = the triangle that has 2 equal sides.
c) the triangle = the triangle with sides of different sizes.
d) right triangle = the triangle that has a right angle.
How is each triangle in the envelope?
Measure and determine what kind of triangle is the pink one, cut out, from the envelope.
4* TEAM OF MATHEMATICIANS:
The perimeter of a triangle is the sum of all its sides, that is:
$P\Delta = L1 + L2 + L3$
Calculates the perimeter of the cut-out triangle.
5* TEAM OF ARTISTS:

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Did you know that the triangle has been used since ancient times? Use the images and explain them to your classmates. The Egyptians used the right triangle to measure land.

There is a musical instrument called a triangle.
There are many traffic signs that are represented by a triangle.
And in religion we have the triangle represented by the Holy Trinity.
There is a group of stars called the Triangle Constellation.
In the Greek alphabet there is a triangle-shaped letter called Delta.
Have you heard of the Bermuda Triangle? It is an area where many boats have disappeared.

LESSON PLAN 14

- Elements of geometry - revision

LESSON PLAN 14: Elements of geometry - revision

Lesson: Maths
Subject: Elements of geometry - revision
Grade: 10-11 years - 4th grade, 3rd grade
Duration: 1 hour
Lesson plan drafted by teacher: Nicoleta Jora

1. Target Outcomes:
Cognitive Process Outcomes:
 The outcomes of the center discipline: Knowledge of learned geometric elements, their characteristics, as well as making connections between knowledge and elements of the environment.
Outcomes of other STEAM disciplines:
Math:
Obj1. to recognize the elements of geometry learned;
Obj2. to name the geometry elements learned;
Obj3. to build objects using the given geometry elements;
Obj4. to solve problems with geometric content;
Obj5. to use the terminology specific to mathematics correctly.

Language:

Obj6. to remember the characters of the story and their characteristics;

Obj7. to recognize the character characterized in the statement of the riddle;

Personal Development:

Obj8. to actively participate in unraveling the puzzles of the didactic game;

Arts:

Obj9. to build geometric bodies, using elements from everyday life.

1.2. Social Product Outcomes:

• Working in a team,

 • Communicating,

 • Being able to share problem and solution-oriented ideas,

• Fulfilling their duties and responsibilities,

• Being able to defend their ideas,

• Presenting the product effectively,

• Understanding the importance of cooperation and collaboration .

2. Materials Used:

laptop, video projector, boards, worksheets, badges, blackboard, chalk, audio device, cube, colored envelopes, keys, geometric figures, sheets, cards, internet, cardboard puppets, thread, cardboard castle, key tokens.

3. Resources

- **"Matematica, manual pentru clasa a 4-a", de Chiran, Rodica, Ed. Aramis, 2006;**
- **„Programa școlară pentru clasa a a 4-a. Matematica", Ministerul Educației și Cercetării, București, 2005**
- **"Matematica, manual pentru clasa a 4-a", de Pacearcă, Ștefan; Mogoș, Mariana, Ed. Aramis, 2006;**
- **" Didactica matematicii în învăţământul primar", de Domnițeanu, Pachița-, Ed. Sinteze, 2003;**
- **"Tratat de pedagogie școlară", de Nicola, Ioan , Ed. Aramis, 2003;**
- **"Perfecționarea lecției în școala modernă", de Cerghit, Ioan , Ed. Didactica si Pedagogica, 1983**
- **https://www.youtube.com/watch?v=6h-SdG1wZ8g**
- **https://ro.pinterest.com/pin/47287864823208004/**

4. Learning Methods and Techniques

integrated approach / the exercise, the conversation, the didactic game, the "Cluster" method, problem solving, the "Cube" method, team activity, independent work, verbal assessment, systematic observation, storytelling, explanation;

5. Groups Considered to be Formed During the Activity:

mixed groups of 5-6 students

6. Implementation Phase;

6.1 Preparation Phase:

The verification of theoretical notions is done starting from the word GEOMETRY, and leaves in a bunch of notions that the children say, from what they have learned.

It continues with the game "Guess who I am?". The teacher formulates, in the form of riddles, statements of the form: I have 8 vertices and equal edges. Guess who I am?

I have no spikes and roll like a ball. Guess who I am?, etc.

6.2: Presenting the problem situation to the student :

The students are presented with a board with the characters from Geometrila's Kingdom: the emperor and his 4 children - princes Rhombus and Small Square and Princesses Triangle and Small Circle. an epic thread is built: to reach the palace, the 4 princes have to overcome some geometric obstacles.

The students will be instructed to group themselves according to the badges received, to help the princes. For each obstacle overcome they will receive a key for the palace doors. Students listen and remember the group they belong to (Squares, Rhombuses, Circles or Triangles).

6.3: Obtaining Information (Leading Questions)

Let's solve the requirements to be able to open the palace doors!

6.4: Idea Development

Students are guided to solve learning tasks.

1. TASK 1. Each team will have to recognize the shape of the presented objects and write them down in the order of their appearance. (a key will be given)
2. TASK 2. The "Little Inventor" game: each team will find two geometric figures in an envelope. Only with these figures, students will draw objects, by combining them. The song "Geometric Figures" from the album "Musical Train 2" will be auditioned. Draw as a group and display the board. They will work listening to the song. (3 keys will be given, one for each team)
3. TASK 3. The favorite game of the emperor is presented: "Cube". Each face of the cube corresponds to a color. Depending on the color chosen by each team, the students will have a task to solve, which they will find in the envelope of the same color on the board. From the 2 tasks in the envelope, the students will choose and solve only one, for which they will receive a key::

++DESCRIBE: trapezium/pyramid.

++COMPARE: What are the similarities and differences between: square and rhombus/rectangle and parallelogram?

++ASSOCIATE: What does an open curved line/cone make you think of?

++ANALYZE: What becomes a rectangle whose length is equal to its width/ a cuboid with all faces square?

+++APPLY: What is the perimeter of a square with a side of 11 cm/ a triangle with each side of 12 cm?

++ARGUMENT: Why is a trapezoid a parallelogram/ a triangle is a quadrilateral?

Listen and remember the rules of the game.

Each team chooses a color of the cube and solves the corresponding exercise.

Students are shown a Rubik's Cube and given some information about the game: it was created in 1974 by the Hungarian sculptor and architecture teacher Ernő Rubik and is the best-selling toy in the world.

At the end, the keys are added up, which they will order, so that they get the message of the Geometric Emperor to them: *Congratulations!*.

6.5: Identifying Needs for the Problem;

1. Objects of different shapes and colors will be presented, and the students of each team will have to collaborate and write down the shape of the objects in the order of their appearance. Problem solving, observation and teamwork are pursued in this part of the lesson.
2. Envelopes, plastic geometric shapes, cards, colored pencils, A4 sheets will be used. Through practice and creativity this task will be accomplished.
3. You will need a cube with different colored faces. Each color will correspond to an envelope with a task to solve for each of the 4 teams.

6.5: Product Development:

1. Students will make connections between the characteristics of geometric figures and objects in the environment. They will get the first key.
2. Students will obtain a plastic work in which only the geometric shapes distributed to each team will be used. The works will be exhibited on the panel. 3 keys will be given, one for each team.
3. The last 6 keys to open the geometric castle will be obtained after describing, comparing, associating, analyzing or arguing opinions about the learned geometric figures.

6.6. Sharing and Mirroring

1. The students will collaborate within the team, being able to recognize the shape of the visualized objects.
2. Students will work individually, but will consult with their team partners in the creation of the works, by sharing ideas that they can translate into a drawing.
3. Each team will solve the task corresponding to the color indicated by the cube, but will also listen to the other teams and determine the degree of correctness regarding the notions related by them.

6.7 Evaluation:

Marshmallows and matchsticks will be distributed to the students. With the help of colleagues from the same teams, they will build a geometric body, based on the instructions in the sheet received, which indicates the number of sides, vertices, faces, as well as the 3D image of the body to be built.

LESSON PLAN 15	• **Engineering a text. Question - Answer Relationship (QAR).** • **How to set up a STEM challenge. Items made of recyclable materials.** • **Treasure Map.**

LESSON PLAN 15 : Engineering a text

Lesson: Rosie Revere, engineer by Andrea Beaty

Subject: Engineering a text. Question - Answer Relationship (QAR).

How to set up a STEM challenge. Items made of recyclable materials.

Treasure Map.

Grade: 4th, 10 - 11 year old students

Duration: 7 class hours (315 minutes)

Lesson plan drafted by teacher: Adriana Noxi Rotaru

1. Target Outcomes:

Cognitive Process Outcomes:

The outcomes of the center discipline:

- improving reading comprehension;
- explaining question-answer relationships in texts by identifying where to find the answers to questions;
- categorizing types of questions by sorting the questions-answer relationships.

Outcomes of other STEAM disciplines:

Biology:

- developing awareness towards littering by classifying the type of rubbish that can/can't be recycled;

- repurposing used items for themselves

Mathematics:

- collecting data and provide elementary interpretations of them

Geography:
- defining a floor plan;
- designing a map to identify the locations of familiar places and objects in their classroom;
- using a map to locate familiar places and things.

1.2. Social Product Outcomes:

• Working in a team,

• Communicating,

• Being able to share problem and solution-oriented ideas,

• Fulfilling their duties and responsibilities,

• Being able to defend their ideas,

• Presenting the product effectively,

• Understanding the importance of cooperation and collaboration .

2. Materials Used:

Projector, Computer, Smartphones, the Internet
Data and results collection sheet, Handouts
Sculpture/coloring materials, string, felt, glue, found/recycled objects

3. Resources:

https://youtu.be/0G-wtK_zc_I
https://wordunited.com/product/abrams-books-rosie-revere-engineer/
https://wordwall.net/resource/29194313
https://youtu.be/21ql5LmcjWw?list=PLKbV_6U6azAtqkbZoIa-aDIoEkVPUBjO4
https://i.pinimg.com/564x/ec/03/9e/ec039edf0a68accfce8b2e3c35d94bd5.jpg
Xtrasource: Film Making Fun with Jimmy Diresta on Netflix
https://www.youtube.com/watch?v=RUkKSYcWvxI
https://i.pinimg.com/564x/44/84/7c/44847ca1b0ab93f9f25f0eb3b004bcb4.jpg
https://roteaprofu.files.wordpress.com/2013/11/1.jpg
https://www.pinterest.com/pin/324259241910979925/
https://wordwall.net/resource/5637529
https://www.stlouisfed.org/-/media/project/frbstl/stlouisfed/education/lessons/pdf/treasure_map.pdf
https://www.rif.org/sites/default/files/images/2022/06/14/Support_Materials/Rosie-Edu-Extension2022.pdf
https://create.kahoot.it/share/treasure-map/4e92d778-e38c-4b59-81a6-8d01696ead30
https://www.jigsawplanet.com/?rc=play&pid=0cff458e9a99
Photos from my class activity:
> https://www.facebook.com/permalink.php?story_fbid=pfbid02UYCKrihLRLNpzHpXMsi7UENxocqX9uXsnK9KkEgmsdzrvuy2tQH3zQL7nJN3Q8mLl&id=102958185418646

Other original resources links:
> https://www.thinglink.com/scene/1551891294903599106
> https://www.thinglink.com/scene/1552326967653564418

4. Learning Methods and Techniques:

Problem Based Learning Method,

Argumentation Based Learning Method

Project Based Learning Method

Techniques; Brainstorming, collaborative work

Learn thru conversation

Create user story before design

Hands-on activities

5. Groups Considered to be Formed During the Activity:

The groups planned to be formed should be included in this section;
The following features should be considered in the Groups created.
*Groups should consist of 3-5 people.
*It should be ensured that the gender distribution is equal.

6. Implementation Phase;

Engineering a text. Question - Answer relationship (QAR)

Start by proposing the students to listen to

''Rosie Revere, engineer'', by Andrea Beaty read aloud.

Reread some passages with them.

Tell the students that they will become text engineers

6.4: Idea Development

Identifying Needs for the Problem;

Explain to the students that there are four types of questions they will encounter.

Define each type of question and give examples from the text:

- Right There Questions: Literal questions whose answers can be found in the text. Often the words used in the question are the same words found in the text.

- Think and Search Questions: Answers are gathered from several parts of the text and put together to make meaning.

- Author and You: These questions are based on information provided in the text but the student is required to relate it to their own experience. Although the answer does not lie directly in the text, the student must have read it in order to answer the question.

- On My Own: These questions do not require the student to have read the passage but he/she must use their background or prior knowledge to answer the question.

6.5: Product Development:

Identifying Possible Solutions

Read a short passage aloud to your students.

Have predetermined questions you will ask after you stop reading. When you have finished reading, read the questions aloud to students and model how you decide which type of question you have been asked to answer.

Show students how to find information to answer the question (in the text, from your own experiences, etc.)

Practice sorting questions on the edge of the text according to the QER criteria

Choosing the Best Solution:

Making the Prototype:

Have the students work in groups to interview a book/animation character at their choice (they can watch interviews on YouTube for documentation) and present it to the class. They are encouraged to make an original presentation.

6.6. Sharing and Mirroring

The reporter presents the interview to the class in any form they choose to (by reading it, by playing, playing a recording on their phones etc.)

6.7 Evaluation:

Have the students conceive/fill a graphic organizer/mind map (on a piece of paper or using one of the online platforms which provides templates) about QAR illustrated with questions from one of their readings.

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How to set up a STEM challenge. Items made of recyclable materials

Following Rosie Revere's example, students bring in classroom plastic bags; each containing different items for example pieces of aluminum foil, scrap papers, plastic bottles, plastic cutlery, plastic toys or parts of plastic toys, batteries, empty cans, glass bars, aerosol cans, paper or cardboard boxes, newspaper, cups cakes, electric cables, used napkins, waxed paper, banana peel.

They collect all items in the middle of 5 tables.

6.4: Idea Development

Divide class into five boys and girls groups. Assign each group a name/they can choose their own name. Give each group one of the five piles of recyclable items. Help groups to identify the items in their piles.

Ask each group to focus on their bag and decide if any of the items could go to a recycling company.

Stick two newspaper sheets; one on each side of the class. Write (Can recycle) on sheet 1, and (Can't recycle) on sheet 2.

Identifying Needs for the Problem;

The students find out that the waste companies are looking for devices for waste processing. They have to build prototypes for any stage of waste processing.

Teacher introduce to students data and results collection sheet

Teacher can help them explore how others have worked with this sheet and solved problems (or we can skip this step to keep a free mind)

Students start by create a short user story before design

They fill data and results collection sheet

6.5: Product Development:

Identifying Possible Solutions

After imagining and discuss multiple possibilities, the next step is to select one to build a model

Teacher can have the role of a moderator/specialist and supports children to observe and identify solutions for waste problems.

Teacher give children opportunities to explore multiple mediums for modeling—such as sculpture materials, string, felt, glue, found objects—and then using them to create models that they present to others

Choosing the Best Solution:

Making the Prototype:

Students build a device that can be used in everyday life to solve different types of waste problems

Every member of the team, boy or girl, participate to every step
of the activity/teams can be encouraged to cooperate

6.6. Sharing and Mirroring

The teams make a short presentation film
pointing to the items that they chose from waste to build their device and
the utility they think their device could have in everyday life.

6.7 Evaluation:

Every team will present the product to another class/school partner for
being evaluated and listen the conclusion of the evaluation

Treasure Map

Students reread in „Rosie Revere, engineer" by Andrea Beaty the passages identified by the teacher with number of the page and of the paragraph. They can draw a time axis for Rosie's inventions.

Suggest the students to practice on telling the position of things on a gridded map by indicating 2 coordinates

Exercise (as a game, after short explanation) reading a map by indicating longitude and latitude

6.4: Idea Development

Identifying Needs for the Problem

Tell the students they are going to still practice their mapping skills by creating a floor plan of the classroom. A floor plan is a type of map that shows where things are located in a room. It is like a picture someone drew looking down from the sky to show you where things are. Practice the vocabulary of mapping: map, map key, compass rose, symbol.

Assign partners, boys and girls work together, and distribute a copy of a random Classroom Map to each pair of students. Direct the students to the example classroom map.

Instruct the students to color the symbols in the colors labeled on the map. Ask the students to then point out the various components of the map (e.g., point to the teacher's desk) and walk around to check that they are finding things accurately.

6.5: Product Development:

Identifying Possible Solutions

They are to imagine they are looking at the classroom from the ceiling. Explain that the map should be similar to the example but of their own classroom. Their map must include all of the items shown in the legend and use the same colors: The teacher's desk must be a brown, colored in, rectangle. The window(s) must be blue lines. Student desks (or tables) must be white squares. The whiteboard must be a green line. The classroom door(s) must be a red line. The flag must be tricolor lines. Tell the students they may also add two additional symbols in the blank spaces, such as a classroom library, armoires or computer stations.

Instruct the student pairs to bring you the maps when they are finished so you can check their work. Allow time for students to work.

Choosing the Best Solution:

Making the Prototype:

When each pair is finished creating their floor plan, proceed as follows: Check their map and then add clues symbols to the legend (for example colored dots). Use those symbols to mark on their map the location of the clues that you hid around the room.

They will find there funny tasks related to the text Rosie Revere, engineer (Build a paper airplane/a hat/a paper toy/design one of Rosie's inventions)

Once the pair is done, they present their work

Allow time for the student pairs to complete the task. As they finish, check their work and award them with a small prize.

Review the important points of the lesson by discussing the following:

  • What type of map shows where things are placed or located in a room? (A floor plan) • What explains the symbols found on a map? (The legend) • What is another word for a legend? (A key)

6.6. Sharing and Mirroring

They transform their maps in puzzles using https://www.jigsawplanet.com/ and ask their classmates to solve.

6.7 Evaluation:

A https://kahoot.it/ quiz: The students look at the plan of a house and answer questions related to identifying the symbols.

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LESSON PLAN 16

- **Aggregation states of water**

LESSON PLAN 16: Aggregation states of water

Lesson: Science

Subject: Aggregation states of water

Grade: 6-8 years - preparatory class, first class, second class

Duration: 5 hours

Lesson plan drafted by teacher: Nicoleta Jora

1. Target Outcomes:

Cognitive Process Outcomes:

The outcomes of the center discipline: To understand the notions of state and aggregation, to know the characteristics of water, to understand that water is the medium of life

Outcomes of other STEAM disciplines:

Exploring the Environment:
Obj1. to identify the characteristics of water, using their sense organs;
Obj2. to classify the states of water, according to its characteristics;
Obj3. to recognize water in nature, in all its forms;
Language:
Obj4. to use appropriate terms in conversations about water (solid, liquid, gas, sea, puddle, river, glacier, snow, steam, etc.);
Obj5. to compose a story according to the given images;
Personal Development:
Obj6. to know the importance, but also the danger that water can represent, under different states of aggregation;
Music:

Obj7. to recognize the differences between the sounds produced by water according to the imposed conditions;

Visual Arts and Practical Skills:

Obj8. to build toys, also using water as a material used;

1.2. Social Product Outcomes:

• Working in a team,

 • Communicating,

 • Being able to share problem and solution-oriented ideas,

• Fulfilling their duties and responsibilities,

• Being able to defend their ideas,

• Presenting the product effectively,

• Understanding the importance of cooperation and collaboration .

2. Materials Used:

laptop, video projector, plastic figurine animals, ice cubes, bowls of hot and cold water, boards, toy tools, coloring sheets, LEGO pieces, internet.

3. Resources

- „Wow ce cool e apa!" Fii pregătit să descoperi cele 17 experimente care te vor convinge că apa este genială!, Fabrica de Experimente
- „Explore, experiment and discover the world of science", by Anna Claybourne, Parragon Books Ltd in 2015, ISBN 978-1-4723-8930-5
- „Educaţia STEM. Descoperă ingineria. Structuri, maşinării, construcţii", de Nick Arnold, Ed. Litera, Bucureşti 2018
- „Educaţia STEM. Descoperă tehnologia. Materiale, sisteme, roboţi", de Nick Arnold, Ed. Litera, Bucureşti 2018
- „Educaţia STEM. Descoperă matematica. Numere, calcule, raţionamente" de Nick Arnold, Ed. Litera, Bucureşti 2018
- „Marea carte a experimentelor", de Antonella Meiani, Instituto Geografico De Agostini S.p.A., Novara 2008, DPH, 2017
- **https://creeracord.com/2018/02/28/28-de-zile-de-activitati-stem-si-steam-pentru-copii/**
- **https://www.twinkl.ro**

4. Learning Methods and Techniques

integrated approach / conversation, storytelling, exercise, game, problem solving, explanation, listening, systematic observation, description.

5. Groups Considered to be Formed During the Activity:

mixed groups of 5-6 students

6. Implementation Phase;

6.1 Preparation Phase:
The "*Morning Meeting*" is held, in which the students will have several tasks to solve:
GOOD MORNING SUPER KIDS!
TODAY IS ……., ….. 2022
SIMONA AND SERGIU CREEP ONTO THE SLEDGE. THEY ARRIVED AT SINAIA. HOPE THEY DON'T CRY OUT ON THE SLED!
THERE WAS WATER ON THE BOTTOM LAST NIGHT. NOW IT'S ICE. WHAT HAPPENED?

REQUIREMENTS:
- WHAT SOUND IS REPEATED IN THE MESSAGE? WRITE THE LETTER s SMALLER M NO.
- WHAT DOES THE CAPITAL LETTER S LOOK LIKE? DO YOU KNOW ANOTHER SIMILAR GRAPHIC SIGN?
- WHAT HAPPENED TO THE WATER? - free discussion

6.2: Presenting the problem situation to the student :
Starting from a winter drawing, discussions will be conducted based on the observed elements, emphasizing the activities of people and animals during this season. Students will be asked to find as many characteristics of winter as possible through the following activities.

6.3: Obtaining Information (Leading Questions)
Let's get to know winter as best as possible, with its positive effects on people

6.4: Idea Development
1. ARCHAEOLOGISTS AT THE SOUTH POLE: Students will be divided into mixed teams. Each team will be equipped with kitchen utensils, then they will receive a "glacier" (piece of ice) with an animal figurine inside. The students, through teamwork, will have to discover the animal in the ice, imitating the work of an archaeologist.
They will have to determine the advantages and disadvantages of practicing this job in such a cold area.
They will use all their senses to list the characteristics of the ice. They will observe what happens to ice at classroom temperature - liquid state, solid state.

2. WHERE IS THE WATER? It will work with the same teams. The students of each team will receive 2 empty glasses. Each team will have to fill the glasses with water and place them on the radiator or in the sun, after marking the water level with the carioca and covering one of the glasses with a lid.
The next day, students will notice that the cup without the lid has less water, while the amount in the other is the same.
Through open discussion, students will conclude that the missing water has turned into water vapor - gaseous state.

3. TRAVELING WATER: divided into teams of 4 students, each group will choose its observer - a girl, who will have the role of leading the team and writing down the observations made throughout the day. The others will prepare a clear plastic cup, fill the cup halfway with water and add food coloring - the 3 primary colors, which they will mix with the water. From the thick kitchen napkins they will make 2 rolls that they will insert at one end into the glass with colored water and the other into an empty glass, making a circuit of 6 glasses in total.
It is intended to observe the movement of water from one glass to another, by means of kitchen paper, and the obtaining of secondary colors, by mixing the primary ones.

4. THE STORY OF THE WATER DROP: the children are given different images to color, but linked by content. They are discussed based on them, questions are asked, the characters are named, so that in the end, with the help of the children, a story is made up based on the given images.

5. THE SOUND OF WATER: students will work in teams of 6 students. They will each receive a straw and a plastic cup, in which they will put water. They will bend the straw to a quarter of its length. On the bend they will cut in half with scissors so that the pieces of straw remain tied. They will insert the longer part into the water, and blow into the shorter part. They will notice that the sounds made change depending on how deep the straw is inserted into the water.

6. GOD OF WATERS: Children are taught to build their own toys. And water is an element that produces great joy in childhood.
We will go to the school garden, each with a half-liter bottle, which the children have drilled in advance with a drill (5 holes at equal distances). They will loosen the cap to allow the water to come out through the holes in the glass. They will then run their finger over the holes several times. They will notice that, after a finger pass through the water coming out of the holes, the water strands will join, and on another pass they will separate, highlighting the bond between the water molecules, which can be easily destroyed by a simple swipe.

6.5: Identifying Needs for the Problem;

1. Each team will need icebreakers and imagination to put themselves in the shoes of an archaeologist and imitate their work. They will need critical thinking skills to find the advantages and disadvantages of practicing this job, as well as observational spirit of the characteristics of the ice and the phenomena that act on it.

2. Identical, transparent glasses with water and a lot of spirit of observation, but also of identifying the phenomenon that acted on the water, as well as concluding what was observed.

3. They will need 6 glasses, water and rolls of kitchen paper. On the other hand, it will aim to educate patience and follow the phenomena that act on the characteristics of the initial materials. Analysis and synthesis of what has been observed will be the critical thinking processes that will be considered.

4. Each team will have different pictures to color, but related by content. The images and connections of each with water will be briefly described. Then, on the front, a story will be composed, starting from the images of each team, images numbered on the back, to facilitate the creative process.

5. You will need a glass and a plastic drinking straw and a pair of scissors. Skill in the use of scissors as well as acoustic analysis of the sounds produced will be required in this experiment.

6. A plastic bottle, water and a pin for puncturing the bottle, for each student. The development of the skills to build toys from materials at hand is pursued through this experiment, but also the development of critical thinking, through the analysis of what is observed.

6.5: Product Development:

1. Each team will break a piece of ice, discovering the details of the archaeologist's work.

2. Each team will experience the evaporation of water under the effect of radiator/sun heat.

3. Each team will get the binary colors starting from the primary ones.

4. A story will be composed about the drop of water from the boards of each team.

5. Each team will experience making different sounds under the influence of water.

6. Each student will make a water-based toy and experience the benefits of building it.

6.6. Sharing and Mirroring

1. Students will identify the animals that live at the South Pole, through the discoveries made in the ice. They will highlight the skills needed to be an archaeologist.

2. The children will watch their own glass, but also that of their classmates, to identify any factor that changes the initial state of the water. They will talk to

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each other about what they observed, so that in the end they can conclude the evaporation.

3. Students in each team will collaborate on the experiment and closely observe the changes that occur, so that at the end they can identify each binary color obtained by mixing two primary colors.
4. Students will collaborate to compose the required story based on the images, using their creativity, but also attention by following the narrative thread.
5. They will all at once build the toy to emit sounds, through water. They will discuss with each other in order to discover the cause of the difference between the sounds emitted.
6. This time the main purpose is fun, water being only the intermediary to the conclusion that water molecules interact with each other

6.7 Evaluation:

The students will have to characterize the water against the timer, in teams. Each team will prepare and choose a representative to speak. So, one student will speak for each team, and while waiting for their turn they will wear headphones. Points will be awarded to each team based on the number of features listed.

LESSON PLAN 17	• The influence of man and environmental factors on bodies - abiotic factors

LESSON PLAN 17: The influence of man and environmental factors on bodies

Lesson: Science
Subject: The influence of man and environmental factors on bodies - abiotic factors
Grade: 9-11 years, 3rd grade, 4th grade
Duration: 5 hours
Lesson plan drafted by teacher: Nicoleta Jora
1. Target Outcomes:
Cognitive Process Outcomes:
The outcomes of the center discipline: Awareness of the importance of biotic and abiotic environmental factors in maintaining the balance of life on Earth.
Outcomes of other STEAM disciplines:
Science:
Obj1. to define terms such as environment, biotic and abiotic environmental factors;
Obj2. to identify abiotic environmental factors;

Obj3. to name plants and animals adapted to different living conditions;
Obj4. to indicate the sources of these environmental factors;
Obj5. to explain the influence of environmental factors on plants and animals.

Mathematics:
Obj6. to measure temperature, air pressure, precipitation level, sun position, with the help of created instruments;

Arts:
Obj7. build tools with skill, following the directions given.

1.2. Social Product Outcomes:
• Working in a team,
 • Communicating,
 • Being able to share problem and solution-oriented ideas,
• Fulfilling their duties and responsibilities,
• Being able to defend their ideas,
• Presenting the product effectively,
• Understanding the importance of cooperation and collaboration .

2. Materials Used:

boards, cards, globe, physical world map, white sheets, blackboard, chalk, video projector, laptop, ppts, laboratory instruments, substances, sticks 50 cm high, adhesive tape, colored paper, a compass/ a 800 ml jar, a balloon, an elastic band, adhesive tape, a drinking straw; the bottom half of a 2 l plastic bottle and a third of it, without a cap, 3-4 stones, marker, water, graduated ruler; plasticine, water, straw, medical alcohol, small, transparent bottle with a narrow neck; a cardboard disc with a diameter of 20 cm, a thin stick, 10-15 cm long, scissors, a pencil, a clock, a place exposed to the sun during school hours

3. Resources

- Programa şcolară pentru clasa a III-a, Ministerul Educației şi Cercetării, Bucureşti, 2004
- „Prietenii naturii", de A.Vidu, L.M.Predeteanu-, Ed.Erc Press, 2000
- „Metodica predarii cunoştinţelor despre natura la clasele I-IV", Ed. Didactică şi Pedagogică, Bucureşti, 1988,
- „Ştiinţe ale naturii- manual pentru clasa a III-a"   Tudora Piţilă, Cleopatra Mihăilescu –, Editura Aramis, 2005;
- „Enciclopedia copiilor", Ed.Aquila, Oradea, 2003
- „Explore, experiment and discover the world of science", by Anna Claybourne, Parragon Books Ltd, New York, 2015
- „Marea carte a experimentelor", de Antonella Meiani, Instituto Geografico De Agostini S.p.A., Novara, 2008
- https://ro.pinterest.com/pin/364580532345605717/
- https://teachbesideme.com/homemade-thermometer-science-experiment/?utm_source=pinterest&utm_medium=social&utm_campaign=social-pug

- **https://naea.typepad.com/naea/**

4. Learning Methods and Techniques

traditional approach / observation, exercise, conversation, explanation, group work, didactic game, experiment, story, problematization

5. Groups Considered to be Formed During the Activity:

Individual or mixed groups of 4-5 students

6. Implementation Phase;

6.1 Preparation Phase:
Students are offered a trip around the globe and they discuss how many seasons we have in our country and whether all areas of the Earth have the same seasons. They list, with the help of the students, animals and plants that live in the polar areas, savannas, but also in the forests of Romania. The causes of such diversity in terrestrial fauna and flora are highlighted.

6.2: Presenting the problem situation to the student :
Then the class is divided into 5 groups of 4-5 students each. Each team will have to read a text to the whole class and discuss each abiotic factor face-to-face and then build a device to measure these factors, according to the instructions received as building instructions. The teacher will visit each group, helping where needed.

6.3: Obtaining Information (Leading Questions)
1. Let's see how we can build a wind indicator! How can we measure air pressure? Let's build an air pressure gauge!
2. Let's build a rain gauge!
3. Can we build a thermometer? Let's see!
4. How was the passage of time measured before? Let's build a sundial!
5. Each student will learn to recycle plant waste by making compost.

6.4: Idea Development
1. **AIR:** Ask what the source of the air is and if there are aerial animals. Plans are presented with respiration in plants and animals, highlighting the interconnection between these breathing bodies. Discussions are directed towards the difference between mountain air and that of overcrowded cities.

The profession of a meteorologist and the devices they use are discussed. Students will build a wind gauge and a simple barometer to measure wind direction and air pressure respectively, telling students that high pressure generally means calm, quiet weather, while low pressure can mean approaching even a storm.
The students are divided into 2 teams, each having to build one of the 2 devices:

- **Wind indicator**: 5 cm wide pieces of colored paper will be cut lengthwise and each student will color as they think. The strips of paper will be glued to the sticks, 3-4 strips on each stick. The sticks will be stuck in the ground in the school garden and, with the help of the compass, it will be indicated which way the wind is blowing.
- **Barometer:** Cut the balloon in half, and fix the part without a hole on the mouth of the glass jar. For safety, it is fixed with an elastic band.Flatten one end of the straw and tape it to the center of the balloon lid.The barometer is taken outside and sheltered in a safe place. When the air pressure is low, the balloon will bulge upwards and the straw will go downwards. Conversely, when the air pressure is high - calm weather, the straw will push the balloon down.

2. **WATER:** Identify the oceans around the globe.

It starts from images of aquatic plants and animals, concluding that it is a living environment for these creatures. Verbally, the water circuit in nature is restored.
As an environmental factor, water is life. Without it, life would not exist. Children are reminded of the threat to the aquatic environment with pollution. Living things drinking water are shown in the images, as well as animals from dry areas.
Next, we will work in groups of 3-4 students.

- A **Pluviometer**, device for measuring precipitation, is being built. Take the half of the bottle, place the stones on the bottom of the bottle. Turn the top of the bottle upside down, fit the bottom and tape together. Use the marker and ruler to draw a centimeter scale on the glass, starting just above the stones at 0. Then add water up to this - 0 mark and place the rain gauge outside, away from buildings, where it can drip directly into it . After the rain is over, the rainfall is counted in centimeters.

3. **TEMPERATURE:** Define the temperature and identify the heat source. They work with the globe, which they divide into three zones: warm, cold and temperate, emphasizing that Romania has a temperate climate.

It presents images of animals and plants from areas of the Earth with different temperatures, as well as from those with several seasons.

- A **Thermometer** will be built, within everyone's reach:Take the bottle and pour equal amounts of water and alcohol, until a fourth of the bottle is filled. Place a straw in the bottle and wrap the plasticine tightly around it and the opening of the bottle. You don't want the straw to touch the bottom of the bottle, so pull it up and fix it with plasticine. Leave the top opening of the straw uncovered. Then the thermometer can be tested! They put their hands around it, it can be placed on the radiator, by the window. different reactions will be obtained.

4. **LIGHT:** The source of natural light is identified - the sun. Light is defined. Thanks to the sun, we have shorter or longer days and nights. Light influences the life of living bodies. Some prefer bright light, others darkness, some shady areas, others bright ones.

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- A **garden sundial** will be built. Punch a hole in the cardboard disc in the center, where a third of the stick is inserted, then fix it in the soil so that the disc is firmly embedded in the ground. When the clock indicates a fixed time, the shadow of the stick is noted on the disk with a pencil and the time is written next to the shadow on the edge of the disk. The operation is repeated at every fixed hour, throughout the schedule of that school day.

5. **SOIL:** Identify the continents on the globe. The definition of soil is given, with the help of the children, clarifying the fact that it is a living environment for terrestrial and underground animals. Desert areas and fertile areas are identified.

Living things from sandy, rocky areas, forests are presented, highlighting the soil as an environmental factor.

Finally, he says that all living bodies adapt to the environmental conditions in which they live.

- It will be **composted** in a bottle. They will place, one by one, a bottle, a layer of soil, a layer of plant residues, a layer of fertilizer, a layer of leaves, newspaper, etc., until the can is filled. The bottle will be left outside until the food scraps rot - and spread around the school garden in the spring.

6.5: Identifying Needs for the Problem;

1. Collaboration between the members of each team will be considered. Students will need 50cm sticks, masking tape, colored paper, a compass/800ml jar, a balloon, a rubber band, masking tape, a drinking straw to build the wind indicator or the barometer. The experiment will have to be watched outside in the school yard.
2. Discovery learning is also considered here. Students will need the bottom half of a 2 L plastic bottle and the third of it, without a lid, 3-4 stones, marker, water, graduated ruler - to build a rain gauge.
3. Student collaboration and learning will be achieved through problem solving, conversation, free discussion and exercise.Students will need plasticine, water, straws, alcohol, small, transparent, narrow-necked glass - for the thermometer.
4. Students will need a cardboard disc with a diameter of 20 cm, a thin stick, 10-15 cm long, scissors, pencil, a clock, a place exposed to the sun during the school program.
5. Students will need a 5L plastic bin, soil, vegetable scraps from the morning snack - from all classes on the landing, solid fertilizer, water, leaves, pieces of newspaper, all for making compost.

6.5: Product Development:

1. An anemometer or barometer to measure air pressure.
2. A pluviometer, device for measuring rainfall.
3. A thermometer.

4. A garden sundial.
5. Compost from plant residues

6.6. Sharing and Mirroring

At the end, each group presents their product, explaining how it works and what its role is.

6.7 Evaluation:

A small game is made with the students "Put your hand in, if you have the courage!", through which the students will extract tickets with certain curiosities, from certain vessels, containing water, sand, etc.
The lesson plan is distributed to the students, reading it with their help.

LESSON PLAN 18

●**Fractions**

LESSON PLAN 18: Fractions

Lesson: Math
Subject: Fractions
Grade: 4ᵗʰ grade
Duration: 1 hour
    1. **Target Outcomes:**
To idenify fractions as a set
Cognitive Process Outcomes:
The outcomes of the center discipline:
Obj1. To establish the numerator and the denominator;
Obj2. To establish a fraction according to the parts a whole is divided into;

Outcomes of other STEAM disciplines:
Communications
- To use the specific terms in order to analyze and describe fractions,
- To communicate with the colleagues in order to fulfill the tasks,

Personal development
- To collaborate with the colleagues
- To take part actively

Art
To build, using Lego pieces, fractions equivalent to the ones indicated.
1.2. Social Product Outcomes:
• Working in a team,
 • Communicating,
 • Being able to share problem and solution-oriented ideas,
• Fulfilling their duties and responsibilities,
• Presenting the product effectively,
• Understanding the importance of cooperation and collaboration .
2. Materials Used:

Paper, cardboard, Lego pieces

3. Resources

 Laptop, videoprojector,

4. Learning Methods and Techniques

Argumentation Based Learning Method
collaborative work

5. Groups Considered to be Formed During the Activity:

Mixed groups

6. Implementation Phase;

6.1 Preparation Phase:

On the board there are written 3 different fractions- 1/4, 3/4, 4/4

6.2: Presenting the problem situation to the student :

Children are asked what these fractions have in common and what is different.

6.3: Obtaining Information (Leading Questions)

It is established that the numerator shows how many parts are taken from the whole, and the denominator shows how many parts the whole is divided into.

6.4: Idea Development

Using the Fractions section of the Math Learning Center app, students practice determining numerator and denominator, parts and whole using various fractions written on the interactive whiteboard.

6.5: Product Development:

Various fractions are written on the board. In groups of 2, one student represents the fraction in a drawing in the form of a circle, and the classmate represents it in the form of a bar.
At the end of the activity, students evaluate each other.

Making the Prototype:

Students receive a cardboard circle on which they must represent the following problem: Andrei ate ½ of his pizza, and Vlad ate 2/4 of his pizza.
• Who ate more pizza? Explain
• How many pizzas did the two children eat together?
• Decorate the pizza as you would like it to look.

6.6. Sharing and Mirroring

• Fractions game – Children build the fractions indicated on the cards from lego pieces.

6.7 Evaluation:

Students have to fulfill the a worksheet that evaluates the lesson.

Bibliography:

- **https://apps.mathlearningcenter.org/fractions/**
- **https://www.shutterstock.com/ro/image-vector/fraction-five-sixth-circle-bar-part-2035102475**
- **https://ro.pinterest.com/pin/508766089167671615/**
- **https://jdaniel4smom.com/2015/02/lego-fraction-games-kids.html**

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LESSON PLAN 19 — •Perimeter

LESSON PLAN 19 : Perimeter

Lesson: Math
Subject: Perimeter
Grade: 4th grade
Duration: 1 hour
   1. **Target Outcomes:**
To calculate the perimeter of a shape.
Cognitive Process Outcomes:
 The outcomes of the center discipline:
Obj1. To define the perimeter;
Obj2. To measure the perimeter of different shapes;

Outcomes of other STEAM disciplines:
Communications
   - To use the specific terms during math lessons,
   - To communicate with the colleagues in order to fulfill the tasks,
Personal development
   - To collaborate with the colleagues
   - To take part actively during lessons.
Art
To reproduce a painting of Piet Mondrial.
1.2. Social Product Outcomes:
• Working in a team,
 • Communicating,
 • Being able to share problem and solution-oriented ideas,
• Fulfilling their duties and responsibilities,
• Presenting the product effectively,
• Understanding the importance of cooperation and collaboration .
2. Materials Used:

Worksheets, markers, ozobots, cardboard

3. Resources

Laptop, videoprojector,

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4. Learning Methods and Techniques

Argumentation Based Learning Method
collaborative work

5. Groups Considered to be Formed During the Activity:

Mixed groups

6. Implementation Phase;

6.1 Preparation Phase:

Preparatory discussions
- Which is the unit of measurement for length?
- How can we measure length?
- What 2D shapes do you know?

6.2: Presenting the problem situation to the student :

What is a perimeter?

6.3: Obtaining Information

The perimeter is the sum of all the sides of a geometric figure, regular or irregular. The formula can also be applied in real life and we find the perimeter of a surface by measuring the lengths of all sides.

6.4: Idea Development

On the interactive board, the children are presented with a volleyball court on which the real dimensions of the sides are noted. The geometric shape of the court is established and its perimeter is calculated.

6.5: Product Development:

Then, students are presented other sports fields, with the sides already measured, and the children are asked to calculate their perimeter..

Making the Prototype:

In mixed teams of two children, with the help of strips of paper, the children create various geometric shapes on the floor. For this, students must measure each side and find the perimeter of the geometric figure formed.

6.6. Sharing and Mirroring

The students watch a material about the painter Piet Mondrial on the laptop. Students discuss the characteristics of the second stage of his creation: surfaces divided into squares and rectangles and the use of only primary colors.
Children are asked to reproduce/paint a picture and then calculate the perimeter of a surface of their choice.

6.7 Evaluation:

Ozobot Race: The class is divided into 6 teams. Each team has a geometric figure to draw. After representing the drawing, at the teacher's signal, the students put the ozobots into operation, and at the end it is determined which route was faster.

Bibliography:
- **https://www.splashlearn.com/math-vocabulary/geometry/perimeter**
- **https://www.youtube.com/watch?v=6mopAgqjkVM**
- **https://www.slideshare.net/duniwayart/mondrianppt**
- **https://art-educ4kids.weebly.com/piet-mondrian-colour-and-line.html**
- **http://educationextras.weebly.com/ozobot-bit.html**

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LESSON PLAN 20 • Plant's Life Cycle

LESSON PLAN 20: Plant's Life Cycle

Lesson: Math
Subject: Plant's Life Cycle
Grade: 4th grade
Duration: 1 hour

   1. **Target Outcomes:**

To identify the plant's life cycle

Cognitive Process Outcomes:

The outcomes of the center discipline:

Obj1. To enumerate the parts of a plant;

Obj2. To establish the correct order of a plant development;

Obj3. To enumerate the conditions a plant needs to develop,

Outcomes of other STEAM disciplines:

Communications

-   To use the specific terms in order to analyse and describe plants,
-   To communicate with the colleagues in order to fulfill the tasks,

Personal development

-   To collaborate with the colleagues
-   To take part actively during lessons,

Art

To create a lap book using the materials given..

1.2. Social Product Outcomes:

• Working in a team,

 • Communicating,

 • Being able to share problem and solution-oriented ideas,

• Fulfilling their duties and responsibilities,

• Presenting the product effectively,

• Understanding the importance of cooperation and collaboration .

2. Materials Used:

Story book, pictures with plants, observation sheet, color paper, various seeds, different fruits and vegetables.

3. Resources

 Laptop, videoprojector,

4. Learning Methods and Techniques

Argumentation Based Learning Method
collaborative work

5. Groups Considered to be Formed During the Activity:

Mixed groups

6. Implementation Phase;

6.1 Preparation Phase:
Children are being presented a new theme for discussion – plant's life cycle. They are being explained the, for most of the plants, the life cycle starts from the seed and fulfills when the plant is fully grown.
Discussions
- Give examples of plants.
- Where do plats grow?
- What are the conditions that a plant to grow?
- Which is the role of plants in the nature?
- Can you imagine life without plants? Give arguments.

6.2: Presenting the problem situation to the student :
Children read the story From seed to plant by Gail Gibbons. There are written on the board the key words *seed/root/stem/leaf/flower*.
There is established the key ideas to remember
- The roots sustain the plant and absorb water and nutrients,
- Leaves uses the sun light to prepare the food for the plant,
- Not all plants have flowers
- Flowers are reproductive structures that produce fruits and contain seeds,
- Seeds contain nutrient that helps in germination and growth of new plants

6.3: Obtaining Information (Leading Questions)
Students receive different fruits and vegetables and are being asked to find the place where seeds hide. Discussions are raised such as where we can find seeds in a fruit (apple vs strawberry)

6.4: Idea Development

Children analyze a collection of different seeds and they name where they are positioned.

6.5: Product Development:

In mixed groups, students plant wheat seeds and beans in order to be analyzed in the following weeks.

6.6. Sharing and Mirroring

According to the information learned, students create a lap book designing the plants evolution, from seed to fully grown.

6.7 Evaluation:

Assessment is done using the Quizzez app. Students use mobile phones to answer the questions included in the questionnaire

6.8 Homework

Using the PlantSnap app, students are asked to identify 10 plants they find in their immediate environment

Bibliography:

- **https://www.amazon.com/Seed-Plant-Gail-Gibbons/dp/0823410250/ref=sr_1_1?crid=1UN23VYSPPXI&keywords=from+seed+to+plant+by+gail+gibbons&qid=1561159289&s=gateway&sprefix=from+seed+to+plant+%2Caps%2C190&sr=8-1**
- **https://www.youtube.com/watch?v=zPqnYYI2Uq8**
- **https://thisreadingmama.com/?attachment_id=43547**
- **https://quizizz.com/admin/quiz/5ca7a41cd5f809001b14a2e1/from-seed-to-plant**
- **https://www.plantsnap.com/**

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LESSON PLAN 21

•3D Shapes

LESSON PLAN 21:3D Shapes

Lesson: Math
Subject: 3D Shapes
Grade: 4ᵗʰ grade
Duration: 1 hour

2. **Target Outcomes:**

Cognitive Process Outcomes:
The outcomes of the center discipline:
Obj1. To name the characteristics of the 3d shapes;
Obj2. To establish similarities and differences, using the Venn diagram;
Obj3. To recognize, in architectural constructions, the geometric shapes used;
Obj4. To reproduce, with the given materials, the studied geometric bodies.

Outcomes of other STEAM disciplines:
Art
To build different types of buildings using the given materials.

1.2. Social Product Outcomes:
• Working in a team,
 • Communicating,
 • Being able to share problem and solution-oriented ideas,
• Fulfilling their duties and responsibilities,
• Presenting the product effectively,
• Understanding the importance of cooperation and collaboration .

2. Materials Used:

Paper, cardboard, ducktape

3. Resources

 Laptop, videoprojector,

4. Learning Methods and Techniques

Argumentation Based Learning Method
collaborative work

5. Groups Considered to be Formed During the Activity:

Mixed groups

6. Implementation Phase;

6.1 Preparation Phase:
Children are being presented images with up-side-down buildings

6.2: Presenting the problem situation to the student :
Each building is associated with a geometrical shape.

6.3: Obtaining Information (Leading Questions)
Students are being asked how was possible to build and how can people live there.

6.4: Idea Development

Working in groups, students describe the given shapes. They compare the shapes, two by two, completing the Venn diagram.

6.5: Product Development:

Using GeoGebra app, students apply the knowledge about shapes, inserting different elements to embellish the work.

Making the Prototype:

Using cardboard and duck tape, students build shapes necessary to reproduce the buildings in a town.

6.6. Sharing and Mirroring
Children reproduce the model of a city using the cardboard buidings.

6.7 Evaluation:

Students have to fulfill the "Shape book", a worksheet that evaluates the lesson.

Bibliography:
- **https://weburbanist.com/2010/02/07/flip-this-home-10-unbelievable-upside-down-houses/**
- **https://www.geogebra.org/geometry?lang=ro**
- **https://jenga.com/**
- **https://cdn.thisreadingmama.com/wp-content/uploads/2019/01/F3DSB-TRM.pdf**

LESSON PLAN 22

• Solar System

LESSON PLAN 22: Solar System

Lesson: Math
Subject: Solar System
Grade: 4th grade
Duration: 1 hour
   3. Target Outcomes:
To define the Solar System
Cognitive Process Outcomes:
 The outcomes of the center discipline:
Obj1. To name the planets of the solar system
Obj2. To explain what the solar system is formed from;

Outcomes of other STEAM disciplines:
Communications
-   To ask relevant quastions to expand the knowledge horisont,
-   To offer well structured descriptions and explanations,
Personal development
-   To maintain active attention and collaboration during conversation
Art
   - to build, using clay, the solar system .
   - to use art to develop and share ideas.
1.2. Social Product Outcomes:
• Working in a team,
 • Communicating,
 • Being able to share problem and solution-oriented ideas,
• Fulfilling their duties and responsibilities,
• Presenting the product effectively,
• Understanding the importance of cooperation and collaboration .
2. Materials Used:

Worksheet, clay, sticks

3. Resources

Laptop, videoprojector,

4. Learning Methods and Techniques

Argumentation Based Learning Method
collaborative worK

5. Groups Considered to be Formed During the Activity:

Mixed groups

6. Implementation Phase;

6.1 Preparation Phase:

Discussions – questions - what do you see when you look up at the sky?
What is the role of the moon?
What makes life possible on eart?

6.2: Presenting the problem situation to the student :

Students are presented the following chart

I KNOW	I WHANT TO KNOW	I HAVE FOUND OUT

6.3: Obtaining Information (Leading Questions)

Students are asked all the information they know about the solar system and then, they ask their own questions.

6.4: Idea Development

Students watch short films about space in order to enrich their knowledge about space.
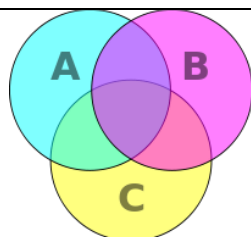
6.5: Product Development:

Venn Diagram – students will fill in a worksheet where they compare and contrast 3 planets – March, Jupiter and Uranus.

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6.6. Sharing and
Essay – students write a
travel into space.

Mirroring
5 minutes essay describing an imaginary

6.7 Evaluation:

Students reproduce the Solar System using clay. They make the sun and the other planets trying to maintain the proportions.

Bibliography:

- https://www.elementaryschoolscience.com/_files/ugd/fe60fb_c28a637e513e48a1bee83b5b060a98bc.pdf
- https://www.esa.int/Education/Teach_with_Rosetta/Our_Solar_System_Journey_to_other_celestial_objects_Teach_with_space_PR01
- https://ro.wikipedia.org/wiki/Diagram%C4%83_Venn
- www.esa.int/Education/Teach_with_Rosetta/Rosetta_s_frequently_asked_questions
- https://www.esa.int/ESA_Multimedia/Sets/Paxi_animations
- https://ik-ptz.ru/ro/fizika/kak-mozhno-sdelat-solnechnuyu-sistemu-svoimi-rukami-maket-solnechnoi.html

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LESSON PLAN 23 • Treasure Hunt

LESSON PLAN 23: Treasure Hunt

Lesson: Technology
Subject: Treasure Hunt
Grade: 4th grade
Duration: 1 hour

   4. Target Outcomes:
To break down a task into smaller steps to facilitate the programming process;
Cognitive Process Outcomes:
 The outcomes of the center discipline:
Obj1. To describe the choices made during the programming steps using comments, presentations and demonstrations.;
Obj2. To program the ozobots respecting the indicated work tasks;

Outcomes of other STEAM disciplines:
Communications
-   To use programming-specific terms in class discussions,
Personal development
-   To collaborate with the classmates,
Art
To build their own obstacle course to the treasure.
1.2. Social Product Outcomes:
• Working in a team,
 • Communicating,
 • Being able to share problem and solution-oriented ideas,
• Fulfilling their duties and responsibilities,
• Presenting the product effectively,
• Understanding the importance of cooperation and collaboration.
2. Materials Used:

Ozobots, working sheet

3. Resources

Mobile phones, laptop, videoprojector,

4. Learning Methods and Techniques

Argumentation Based Learning Method
collaborative work

5. Groups Considered to be Formed During the Activity:

Mixed groups

6. Implementation Phase;

6.1 Preparation Phase:

There are prepared the necessary materials for the activity.

6.2: Presenting the problem situation to the student :

What do you know about treasures?
What about pirates?
What books and movies do you know about this topic?

6.3: Obtaining Information (Leading Questions)

Students answer the questions presenting all the information known about treasures, pirates, mistery islands.

6.4: Idea Development

The knowledge related to programming an ozobot through the ozoblockly program is recapitulated. The teacher will exemplify the synchronization of the ozobot with the ozoblockly software.

6.5: Product Development:

Students receive a treasure map with an obstacle course that they will only complete if they correctly program the ozobots using the ozoblockly app.

Making the Prototype:

Children are instructed to divide the route into smaller parts before moving on to the next step. Thus, an approach of breaking problems into small steps gives the possibility of testing on small areas and can make the necessary adjustments on the fly when it comes to programming.

6.6. Sharing and Mirroring

• In mixed groups, students follow the route indicated on the treasure map, programming the ozobot so that it can reach the end of the route.
The groups that finish first get additional tasks – they must include lights, rotations and speeds.

6.7 Evaluation:

In mixed teams, students play the Escape Room-Treasure Hunt game online.

Bibliography:

- https://www.worldhistory.org/article/1842/treasure--booty-in-the-golden-age-of-piracy/
- https://www.historyhit.com/famous-pirate-treasure-hauls/
- https://www.youtube.com/watch?v=cNkaFgFG4UM
- https://ozobot.com/create/ozoblockly
- https://mathsciencewarrior.weebly.com/ozobots.html

https://play.google.com/store/apps/details?id=air.mirchigames.new.eldorada.escape.doors.room.door.puzzle.adventure&hl=ro&gl=US

LESSON PLAN 24 • The Moon, Earth's natural satellite

LESSON PLAN 24: **The Moon, Earth's natural satellite**

Lesson: The Moon, Earth's natural satellite
Subject: STEAM activity
Grade: 3rd grade, 9-10 years old
Duration: 45 minutes
Lesson Plan drafted by teacher: Mirela Elena Vasilică
1. Target Outcomes:
- Familiarization with information and scientific phenomena associated with the earth's natural satellite

Cognitive Process Outcomes:
The outcomes of the center discipline:
-to describe the formation of the Moon in the scientifically accepted version.

Outcomes of other STEAM disciplines:

Biology:

to explain the phases of the moon and their formation

Physics:

-to specify the characteristics of the Moon as Earth's natural satellite

Mathematics:

-to obtain spherical bodies from glossy paper

Art:

-to make paintings from natural materials for the phases of the moon.

1.2. Social Product Outcomes:

• Working in a team, accepting roles in the team, responsibility, partnership

 • Communicating,

 • Being able to share problem and solution-oriented ideas,

• Meeting deadlines

• Fulfilling their duties and responsibilities,

• Being able to defend their ideas,

• Presenting the product effectively,

• Understanding the importance of cooperation and collaboration .

2. Materials Used:

internet, Esa Kids educational films, interactive whiteboard, laptop, smart phones, video projector, the text "Papa, Please Get the Moon for Me", author Eric Carle

3. Resources

https://www.youtube.com/watch?v=2jVsuVZbez8

https://www.youtube.com/watch?v=X-o9PmbDNzA

(educational films ,,Paxi explores the Moon'', "Paxi and the Moon phases")

4. Learning Methods and Techniques

Brainstorming

I know, I want to know, I've learned

Multiple Intelligences

Project

5. Groups Considered to be Formed During the Activity:

The students are organized into mixed teams of 5 members each, depending on the knowledge interests. In every team there is at least one girl. There are also teams with students with special educational needs.

6. Implementation Phase;

6.1 Preparation Phase:
Create your student groups.
Choose your group leader
Choose a reporter

6.2: Presenting the problem situation to the student :
Reading of the text "Papa, Please Get the Moon for Me", author Eric Carle.
On the theme of the text, various questions/provocations are forwarded:
What is the moon? When do we see it? Does it always have the same shape and colour? Can we reach the moon?

6.3: Obtaining Information (Leading Questions)
Completion of a table by each child.
On the sheets, children write down what and how much they know about the moon and what they would like to know about the moon.
On the interactive whiteboard, the information is centralised. Watching educational films ,,Paxi explores the Moon", "Paxi and the Moon phases".

6.4: Idea Development

Children are divided into workshops using smart phones:
1.   Geographers team: write down on a poster basic information about the characteristics of the moon, the phases of the moon.
2.   Engineers' team: build a giant 3D moon from packaging wrapped in silver paper.
3.   Artists' team: using plastic caps and plasticine, they make a moon phase drawing.
   4. Actors' team: create a dialogue between the two characters from the book "Papa, Please Get the Moon for Me" explaining the waxing and waning of the moon.

6.5: Product Development:

Fill in the "I have learned" section at the end.
Making the Prototype:

The students present the products made with each type of intelligence.

6.6. Sharing and Mirroring:
The activity is dynamic, it trains the students.

6.7 Evaluation:

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The children work on a test in the Kahoot app to assess basic information about the Moon.
https://create.kahoot.it/my-library/kahoots/754a6e8f-1921-4337-a3f7-43651d5159e5

LESSON PLAN 25

• **Engineering a text. Comic strip making of.**
• **The sun**
• **The life cycle of a bird.**

LESSON PLAN 25 : The sun/ **The life cycle of a bird**

Lesson: Whose is the sun by Yuri Averenkov
Subject: Engineering a text. Comic strip making of.
⠀⠀⠀⠀⠀The sun
⠀⠀⠀⠀⠀⠀The life cycle of a bird.
Grade: 4th, 10 - 11 year old students
Duration: 7 class hours (315 minutes)
Lesson plan drafted by teacher: Adriana Noxi Rotaru
1. Target Outcomes:
Cognitive Process Outcomes:
The outcomes of the center discipline:

- improving reading comprehension;
- explaining question-answer relationships in texts by identifying where to find the answers to questions;
- categorizing types of questions by sorting the questions-answer relationships.

Outcomes of other STEAM disciplines:
Biology:

- developing awareness towards littering by classifying the type of rubbish that can/can't be recycled;

- repurposing used items for themselves

Mathematics:

- collecting data and provide elementary interpretations of them

Geography:
- defining a floor plan;
- designing a map to identify the locations of familiar places and objects in their classroom;
- using a map to locate familiar places and things.

1.2. Social Product Outcomes:
• Working in a team,
• Communicating,
• Being able to share problem and solution-oriented ideas,
• Fulfilling their duties and responsibilities,
• Being able to defend their ideas,
• Presenting the product effectively,
• Understanding the importance of cooperation and collaboration .

2. Materials Used:

Projector, Computer, Smartphones, the Internet
Data and results collection sheet, Handouts
Sculpture/coloring materials, string, felt, glue, found/recycled objects

3. Resources:

https://youtu.be/0G-wtK_zc_I
https://wordunited.com/product/abrams-books-rosie-revere-engineer/
https://wordwall.net/resource/29194313
https://youtu.be/21ql5LmcjWw?list=PLKbV_6U6azAtqkbZoIa-aDIoEkVPUBjO4
https://i.pinimg.com/564x/ec/03/9e/ec039edf0a68accfce8b2e3c35d94bd5.jpg
Xtrasource: Film Making Fun with Jimmy Diresta on Netflix
https://www.youtube.com/watch?v=RUkKSYcWvxI
https://i.pinimg.com/564x/44/84/7c/44847ca1b0ab93f9f25f0eb3b004bcb4.jpg
https://roteaprofu.files.wordpress.com/2013/11/1.jpg
https://www.pinterest.com/pin/324259241910979925/
https://wordwall.net/resource/5637529
https://www.stlouisfed.org/-/media/project/frbstl/stlouisfed/education/lessons/pdf/treasure_map.pdf
https://www.rif.org/sites/default/files/images/2022/06/14/Support_Materials/Rosie-Edu-Extension2022.pdf

https://create.kahoot.it/share/treasure-map/4e92d778-e38c-4b59-81a6-8d01696ead30
https://www.jigsawplanet.com/?rc=play&pid=0cff458e9a99
Photos from my class activity:
https://www.facebook.com/permalink.php?story_fbid=pfbid02UYCKrihLRLNpzHpXMsi7UENxocqX9uXsnK9KkEgmsdzrvuy2tQH3zQL7nJN3Q8mLl&id=102958185418646
Other original resources links:
https://www.thinglink.com/scene/1551891294903599106
https://www.thinglink.com/scene/1552326967653564418

4. Learning Methods and Techniques:

Problem Based Learning Method,
Argumentation Based Learning Method
Project Based Learning Method
Techniques; Brainstorming, collaborative work
Learn thru conversation
Create user story before design
Hands-on activities

5. Groups Considered to be Formed During the Activity:

The groups planned to be formed should be included in this section;
The following features should be considered in the Groups created.
*Groups should consist of 3-5 people.
*It should be ensured that the gender distribution is equal.

6. Implementation Phase;

Engineering a text. Question - Answer relationship (QAR)

Start by proposing the students to listen to

  "Rosie Revere, engineer", by Andrea Beaty read aloud.

Reread some passages with them.

Tell the students that they will become text engineers

6.4: Idea Development

Identifying Needs for the Problem;

Explain to the students that there are four types of questions they will encounter.

Define each type of question and give examples from the text:

- Right There Questions: Literal questions whose answers can be found in the text. Often the words used in the question are the same words found in the text.

- Think and Search Questions: Answers are gathered from several parts of the text and put together to make meaning.

- Author and You: These questions are based on information provided in the text but the student is required to relate it to their own experience. Although the answer does not lie directly in the text, the student must have read it in order to answer the question.

- On My Own: These questions do not require the student to have read the passage but he/she must use their background or prior knowledge to answer the question.

6.5: Product Development:

Identifying Possible Solutions

Read a short passage aloud to your students.

Have predetermined questions you will ask after you stop reading. When you have finished reading, read the questions aloud to students and model how you decide which type of question you have been asked to answer.

Show students how to find information to answer the question (in the text, from your own experiences, etc.)

Practice sorting questions on the edge of the text according to the QER criteria

Choosing the Best Solution:

Making the Prototype:

Have the students work in groups to interview a book/animation character at their choice (they can watch interviews on YouTube for documentation) and present it to the class. They are encouraged to make an original presentation.

6.6. Sharing and Mirroring

The reporter presents the interview to the class in any form they choose to (by reading it, by playing, playing a recording on their phones etc.)

6.7 Evaluation:

Have the students conceive/fill a graphic organizer/mind map (on a piece of paper or using one of the online platforms which provides templates) about QAR illustrated with questions from one of their readings.

How to set up a STEM challenge. Items made of recyclable materials

Following Rosie Revere's example, students bring in classroom plastic bags; each containing different items for example pieces of aluminum foil, scrap papers, plastic bottles, plastic cutlery, plastic toys or parts of plastic toys, batteries, empty cans, glass bars, aerosol cans, paper or cardboard boxes, newspaper, cups cakes, electric cables, used napkins, waxed paper, banana peel.

They collect all items in the middle of 5 tables.

6.4: Idea Development

Divide class into five boys and girls groups. Assign each group a name/they can choose their own name. Give each group one of the five piles of recyclable items. Help groups to identify the items in their piles.

Ask each group to focus on their bag and decide if any of the items could go to a recycling company.

Stick two newspaper sheets; one on each side of the class. Write (Can recycle) on sheet 1, and (Can't recycle) on sheet 2.

Identifying Needs for the Problem;

The students find out that the waste companies are looking for devices for waste processing. They have to build prototypes for any stage of waste processing.

Teacher introduce to students data and results collection sheet

Teacher can help them explore how others have worked with this sheet and solved problems (or we can skip this step to keep a free mind)

Students start by create a short user story before design

They fill data and results collection sheet

6.5: Product Development:

Identifying Possible Solutions

After imagining and discuss multiple possibilities, the next step is to select one to build a model

Teacher can have the role of a moderator/specialist and supports children to observe and identify solutions for waste problems.

Teacher give children opportunities to explore multiple mediums for modeling—such as sculpture materials, string, felt, glue, found objects—and then using them to create models that they present to others

Choosing the Best Solution:

Making the Prototype:

Students build a device that can be used in everyday life to solve different types of waste problems

Every member of the team, boy or girl, participate to every step of the activity/teams can be encouraged to cooperate

6.6. Sharing and Mirroring

The teams make a short presentation film

pointing to the items that they chose from waste to build their device and the utility they think their device could have in everyday life.

6.7 Evaluation:

Every team will present the product to another class/school partner for being evaluated and listen the conclusion of the evaluation

Treasure Map

Students reread in „Rosie Revere, engineer" by Andrea Beaty the passages identified by the teacher with number of the page and of the paragraph. They can draw a time axis for Rosie's inventions.

Propose the students to practice on telling the position of things on a gridded map by indicating 2 coordinates

Exercise (as a game, after short explanation) reading a map by indicating longitude and latitude

6.4: Idea Development

Identifying Needs for the Problem

Tell the students they are going to still practice their mapping skills by creating a floor plan of the classroom. A floor plan is a type of map that shows where things are located in a room. It is like a picture someone drew looking down from the sky to show you where things are. Practice the vocabulary of mapping: map, map key, compass rose, symbol.

Assign partners, boys and girls work together, and distribute a copy of a random Classroom Map to each pair of students. Direct the students to the example classroom map.

Instruct the students to color the symbols in the colors labeled on the map. Ask the students to then point out the various components of the map (e.g., point to the teacher's desk) and walk around to check that they are

finding things accurately.

6.5: Product Development:

Identifying Possible Solutions

They are to imagine they are looking at the classroom from the ceiling. Explain that the map should be similar to the example but of their own classroom. Their map must include all of the items shown in the legend and use the same colors: The teacher's desk must be a brown, colored in, rectangle. The window(s) must be blue lines. Student desks (or tables) must be white squares. The whiteboard must be a green line. The classroom door(s) must be a red line. The flag must be tricolor lines. Tell the students they may also add two additional symbols in the blank spaces, such as a classroom library, armoires or computer stations.

Instruct the student pairs to bring you the maps when they are finished so you can check their work. Allow time for students to work.

Choosing the Best Solution:

Making the Prototype:

When each pair is finished creating their floor plan, proceed as follows: Check their map and then add clues symbols to the legend (for example colored dots). Use those symbols to mark on their map the location of the clues that you hid around the room.

They will find there funny tasks related to the text Rosie Revere, engineer (Build a paper airplane/a hat/a paper toy/design one of Rosie's

inventions)

Once the pair is done, they present their work

Allow time for the student pairs to complete the task. As they finish, check their work and award them with a small prize.

Review the important points of the lesson by discussing the following:

 • What type of map shows where things are placed or located in a room? (A
  floor plan) • What explains the symbols found on a map? (The legend) • What is another word for a legend? (A key)

6.6. Sharing and Mirroring

They transform their maps in puzzles using https://www.jigsawplanet.com/ and propos it to their colleagues to solve.

6.7 Evaluation:

A https://kahoot.it/ quiz: The students look at the plan of a house and answer questions related to identifying the symbols.

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LESSON PLAN 26 • Winter

LESSON PLAN 26: Winter

Lesson: Science
Subject: Winter
Grade: 6-7 years - preparatory class, first class, second class
Duration: 5 hours
Lesson plan drafted by teacher: Nicoleta Jora
1. Target Outcomes:
Cognitive Process Outcomes:
The outcomes of the center discipline: To know the characteristics of the winter season, being able to highlight differences from the other seasons and being able to recognize specific human activities during this period.
Outcomes of other STEAM disciplines:
Exploring the Environment:
Obj1. to know the seasons of the year and their specific months;
Obj2. to characterize the winter season, using elements from nature's calendar;
Obj3. perform mathematical operations with intuitive elements about winter;
Language:
Obj4. to anticipate the possible relationship between the given words;
Obj5. to discover the true causality between the given terms, in the context of the lyrical text read;
Personal Development:
Obj6. to identify the causes that determined the change in the way of spending free time, for today's children, by comparison with the childhood of their grandparents;
Music:
Obj7. to recognize the source of the sounds of nature in the winter season;
Obj8. to introduce these sounds, by imitation, into a song;

Visual Arts and Practical Skills:
Obj9. to discover the way to draw the learned letters, using the given materials;

1.2. Social Product Outcomes:
• Working in a team,
• Communicating,
• Being able to share problem and solution-oriented ideas,
• Fulfilling their duties and responsibilities,
• Being able to defend their ideas,

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• Presenting the product effectively,
• Understanding the importance of cooperation and collaboration .

2. Materials Used:

laptop, video projector, nature calendar, tokens with winter elements, pictures of winter from the past and today - from the family album, plastic tray, fine salt, magnets, tokens with snowmen, internet.

3. Resources

- https://www.facebook.com/Furnicute-jucause-103293708014448/photos/pcb.186890322988119/186889812988170/
- Fragment din filmul ''Amintiri din copilărie'' 1964.
- https://www.aletheea.ro/metode-dezvoltare-gandire-critica/?fbclid=IwAR25NmcLejZKi8_0sApnpE1pfEE-mN57YO-FKRNGAJ9u5fwhUe9e3CdvFjE
- Capcană pentru Omul de turtă dulce - Activitate STEM

4. Learning Methods and Techniques

integrated approach / conversation, exercise, case study, game, problematization, explanation, audition, systematic observation, discovery, critical thinking.

5. Groups Considered to be Formed During the Activity:

mixed groups of 5-6 students

6. Implementation Phase;

6.1 Preparation Phase:
The students are divided into groups already, in the Step by Step classes. This is the way it works, all the time. Each one has, in turn, the role of leader or reporter.

6.2: Presenting the problem situation to the student :
Starting from a winter drawing, discussions will be conducted based on the observed elements, emphasizing the activities of people and animals during this season. Students will be asked to find as many characteristics of winter as possible through the following activities.

6.3: Obtaining Information (Leading Questions)
Let's get to know winter as best as possible, with its positive effects on people

6.4: Idea Development
1. The teacher will give the students 4-5 terms related to winter (man, ice cream, shovel, coal, kiss), which they will write on the board. Students will be

divided into teams of 4-5 students. Each team will have to decide the relationship between these terms. After each team has reached a conclusion, the students are read the lyrical text "The Man Who Wanted a Kiss", by Oltea Paraschiv, with the task that each one discovers the terms given initially, as well as the connections between them, as they appear in text.

2. After studying the text and the causality between the terms, the students will be given the task of presenting the relationship between them through a drawing, which they will make in teams, on an A0 sheet. They will also have to draw the elements of nature that lead to the "survival" of a snowman.

3. A comparative photo album "Winter from today and from another time" will be made, with family photos from the winter season. Then a fragment of "Childhood Memories", by Ion Creangă, will be watched, and the duration and activities of children's free time in the past, in the winter, will be discussed. We will identify the causes of the decrease in spending free time in nature, we will analyze and offer solutions to achieve a common goal of spending as much time as possible outside, at the expense of the time spent with gadgets.

4. Different sounds will be brought to the students' attention, with the indication to recognize their source. Then, in mixed teams, they will compose/adapt a song, in which they introduce, by reproduction, these sounds.

5. Each team will be given a plastic tray with fine table salt - snow, 4 snowman tokens stuck to magnets, and 4 other magnets. They will be tasked with finding a way to write letters on the rink without touching the salt.

6.5: Identifying Needs for the Problem;

1. Children will use their creativity to discover a possible connection between man, frozen, shovel, coal and kiss. They will use their literacy skills to discover details of the text "The Snowman Who Wanted a Kiss" by Oltea Paraschiv, which they will compare with their predictions.

2. Students will need to use their drawing skills to draw the poem after identifying the natural elements that help a snowman 'survive'.

3. The children will make a photo album with winter images from the past and present, then they will also watch a fragment of a film about the winter of yesteryear. Then they will have to identify the causes of the decrease in spending time in nature of today's children, looking for solutions to solve this problem.

4. Students' musical skills will be called upon to recognize the source of the sounds they hear, with which to compose winter songs.

5. They will need materials to build an artificial ice rink (tray, fine salt, magnets, paper tokens, machine for gluing the tokens to the magnets). They will then have to identify ways to write on the 'ice' using magnets.

6.5: Product Development:

1. Each team will create a story, starting from the given elements, using the prediction.

2. Each team will draw a winter picture, highlighting the elements necessary for the existence of snow in nature.
3. One winter photo album, from each team, past-present comparison.
4. Developing musical skills.
5. Toys made from products found in the house and using them for educational purposes.

6.6. Sharing and Mirroring
1. Students will "exchange" ideas for interconnecting the given elements, through the stories created by their classmates.
2. The children will discover in the drawings of the other teams elements necessary for the existence of snow in nature
3. Each team will offer solutions to spend as much time as possible outside, instead of time spent with gadgets..
4. Students will become aware of and remember sounds specific to winter, as well as their usefulness in art.
5. Finally, they will use the toys created for fun in teams, using writing skills on a material other than paper.

6.7 Evaluation:
The students will have to build, from LEGO pieces, a "greenhouse" for a snowman, in which he will benefit from all the conditions for survival.
HELP! OUR FRIEND THE SNOWMAN IS MELTING!
What will the greenhouse look like? What will it be made of? What size will it actually be? How will it work? What conditions does it offer? What anti-boredom activities will it offer the "tenant"? How many rooms will it have?

LESSON PLAN 27

• Our Food

LESSON PLAN 27: Our Food

Course: Science
Subject: Our Food
Grade: Primary School 4th grade
Duration: 6 x 40 minutes (6 lesson hours)

1. Target Achievements:
1.1. Acquisitions of the discipline (Science) in the center:
1. Explains the relationship between living life and nutrient content.
2. Deduces that water and minerals are found in all foods.
3. Discusses the importance of freshness and naturalness of foods for a healthy life, based on research data.
4. Relates a balanced diet with human health.

1.2. Benefits of Other STEAM Disciplines:

Social studies
IMakes inferences about the types of vegetables and fruits grown in and around the place where it lives.

Maths
Adds up to four-digit natural numbers to find the calories of food.

Information Technologies
Conducts research on foods on the Internet. Creates, saves and prints documents with text and visual content. (Prepares a document with research results)

Visual arts
Uses art elements and design principles while creating visual artworks.

2. Materials Used:
Computer, lego set, cardboard, scissors, colored paints, glue, eva, background cardboard, food pictures, A4 paper
3. Resources

4. **Learning Methods and Techniques**
Problem Based Learning Method,
Argumentation method
Project Based Learning Method
techniques; Brainstorming, collaborative work

5. Groups Considered to be Formed During the Activity

Groups should consist of 3-5 people.
It should be noted that it is a homogeneous group in terms of level.
Care should be taken to ensure that the gender distribution is equal.

6. Implementation Phase;
6.1 Preparation Phase:
Student groups are created
6.2: The student is presented with the problem situation:
You will cook meals for family members at home. How do you prepare a meal for
family members to eat healthier?
6.3: Getting Information (Leading Questions)
What are the reasons that affect the continuation of nutritional problems?
What are the responsibilities of individuals regarding healthy eating?
What are the barriers to healthy eating?

A "Concept Map" is made about healthy eating.
Watch the video below in class.

6.4: Idea Development

Identifying Needs for the Problem;
Groups move on to the idea development stage. Each group shares their ideas with
their group mates in the light of the information they obtained in the previous stage. In
this section, they try to find an answer to the question of what they might need to solve
the problem.
What kind of product should we create for a healthy diet?
How should a meal be for a healthy diet?

6.5: Product development:

Identifying Possible Solutions;
At this stage, student groups identify possible solutions using the brainstorming
technique.

Choosing the Best Solution:

The solutions proposed in the previous stage are evaluated in terms of strengths and weaknesses, advantages and disadvantages, and the best solution is chosen. At this stage, it is recommended to use the argumentation method. Which products to produce are chosen by the students through in-group discussions. The teacher can guide the students about the issues they need to consider.

Making the Product:
After the solution proposal is selected, the student groups are expected to form the product of the subject.
Group Work Products:
1. Chart for calculating calories
2. Sketching a healthy menu plate
3. Preparing a questionnaire about healthy nutrition and analyzing data
4. Conducting an interview
5.Healthy eating concept map
6. Presentation of healthy food elements
7. A meal designed for healthy eating

6.6. Sharing and Mirroring

The shares envisaged by the students are considered, and the administration and the parents of the students are invited to exhibit their products in an exhibition, short video shoots and necessary social media accounts are opened to inform people about their work. From the beginning to this process, feedback is received about the point at which they have improved themselves, what they have learned, and the areas they will focus on in line with their interests and abilities.

6.7 Evaluation:

At the stage of presenting the in-class products of each of the groups, they are asked to evaluate by the other groups by answering the questions below.
What are the strengths of the offered product?
What are the weaknesses of the offered product?
Share your suggestions to strengthen their weaknesses.
It is recommended that students come together with the groups they worked with at the beginning and prepare a plate design for three meals, breakfast, lunch and dinner. The created plate design is shared with the whole class by the groups.

LESSON PLAN 28

- Calculating Area with Pick's Theorem

LESSON PLAN 28 : Calculating Area with Pick's Theorem

Course: Science-Mathematics
Subject: Calculating Area with Pick's Theorem
Grade: Primary(4)
Duration: 160 minutes (4 lesson hours)
1. Target Outputs:
1.1. Cognitive Process Outcomes:
Central discipline Outcomes:
● Develops ideas and theories by actively exploring real-world problems.
● Identifies key issues that clarify different perspectives and lead to better solutions.
● Consciously manages the design process to generate ideas, test theories, create innovative works or solve real problems.
● Explains her/his thoughts and research results.
● Applies engineering approaches to specific problems.
● Prepares the prototype of the product.
Outputs from other STEAM disciplines
Science
● Observes animals in their surrounding environment
● Takes care to protect the animals in the surrounding environment
Maths
● Classifies simple objects used in daily life according to their properties and associates them with geometric shapes.
● Knows and applies Pick's Theorem.
● Solves problems using meters and centimeters.
Visual Arts
● Makes different designs using colors.
Engineering
● Explains the basic processes needed for a project.
● Evaluates the benefits and risks of a design.

1.2. Social product outputs:
● Working as a team,
● Communication,
● Ability to share problem and solution-oriented ideas,

● Fulfilling their duties and responsibilities,
● Being able to defend their ideas,
● Presenting the product effectively,
● Understanding the importance of cooperation and collaboration.
● Approaching problems from a new perspective.
● Combining feedback effectively.
● Being able to listen to your friends without prejudice.

2. Materials Used:

Waste boxes, duct tape, silicone, adhesive cover, adhesive, transparent gelatin, waste yogurt boxes, scissors, screws, various waste threads, unused sweaters, fiber

3. Resources

1. Ball, K. (2017). *Garip Eğriler, Tavşanları Saymak ve Diğer Matematiksel Keşifler.* (Boğaç Karçıka)(1.baskı) Ankara: Tübitak Yayınları
2. Raman, M.,Ohman L&D. Two Beautiful Proof's of Pıck's Theorem. https://pdfs.semanticscholar.org/
3. https://en.wikipedia.org/wiki/Pick%27s_theorem

4.Pick's Theorem Revisited, Dale Varberg, *The American Mathematical Monthly* Vol. 92, No. 8 (Oct., 1985), pp. 584-587

5.Garip Eğriler, Tavşanları Saymak ve Diğer Matematiksel Keşifler, Keith Ball, Tübitak Yayınları, Çev: Boğaç Karçıka, 2017, Ankara

4. Learning Methods and Techniques

Methods: Problem-Based Learning, Argumentation-Based Learning, Project-Based Learning, Discussion, Question-Answer and Collaborative Working

Techniques: Brainstorming, Vision Development, Observation, collaboration

5. Groups Considered to be Formed During the Activity:

*Groups should consist of 3-5 people.
*It should be noted that it is a homogeneous group in terms of level.
* Gender distribution should be equal.

6. Implementation Phase;

6. 1 Preparation Phase:
Create your student groups.
Choose your group leader
Choose a writer

6.2: Presenting the problem situation to the student:

It was a cold winter day. The little dog, who was hungry and very cold, was looking for a warm home to feed. After wandering around for a while, he thought that the school might be a cozy home for him, and went through the school gate. At that time, the student, who was going out for recess, was upset when he saw the Little Dog and gave him food from his lunch box and wrapped the Little Dog with his scarf around his neck to prevent him from getting cold. Like the students in his class, he loved Little Dog very much and they wished he had a home of his own.

Teacher; People are looking for new ways to find solutions to the challenges animals face in nature during the winter season, and what could these methods be? (Students express their ideas with the brainstorming technique.)

6.3: Getting Information (Leading Questions)

In order to find a solution to the problem, the teacher asks the students to think about the following questions, do research and write down the information they have gained. Students do their research on the subject in groups.
● What can be done for an animal that cannot meet its shelter and nutrition needs?
● How can I do this?
● What do I need for this?
● What kind of a nest would you build for an animal that could not meet its needs? What would you cover the nest with?
● What kind of a nest would you make for a small puppy's life, unaffected by the weather?
● How can we benefit from recycling materials when making a nest?
● How do you calculate the dimension?
● Have you heard of the Pick Theorem?
● Can we calculate the dimension of each part of the nest with the Pick Theorem ?

6.4: Idea Development

● **Determining the Requirements of the Problem;**

Groups move on to the idea development stage. Each group shares their ideas with their group mates in the light of the information they have acquired in the previous stage. In this section, they try to answer the question of what they might need to solve the problem.

The teacher transfers the theoretical knowledge to the students at this stage.

Pick's theorem is used to calculate the areas of geometric shapes on a paper made up of points. A geometric figure is drawn on this dotted paper. When calculating the area of the geometric figure, the points on and inside the edges of the shape are used. Half the number of points on the sides of the geometric figure is added up with the number of points inside the shape minus one. The result obtained gives the area of the geometric figure.

In order to use Pick's theorem, the vertices of the geometric figure must be on the points. At the same time, one side of the geometric figure should not cut the other sides. When these conditions are met, it is possible to use the pick theorem.

The first thing to do is to divide the given geometric shape into geometric shapes that we can easily calculate. The area of the first geometric shape is found by adding up the areas of this new geometric shape divided.

With the Pick's theorem, the area is calculated as follows:

Area = interior points + half of the points on the edge – 1

For Pick's theorem, calculations can also be made on a board with nails. It is possible to calculate the area by drawing certain geometric shapes by hammering nails at equal intervals on a flat board. Calculation of geometric shapes will now be easier with Pick's theorem.

6.5: Product development:
● Identifying Possible Solutions;

In this section, students present the most durable and comfortable nest models for an animal that cannot meet its shelter and nutrition needs as a result of their research.

Choosing the Best Solution:
- **A nest is made with recycling materials for the small dog that needs shelter. Students first draw the A4 model of the nest to be built, and then break each area of the model into geometric shapes. Using the Pick Theorem, they calculate the area in their checkbook. (1 lesson hour for the Teacher Pick Theorem) does the activity.)**

● Construction of the Prototype:
Dog house from recycling bins
-Students are divided into groups of 5-6.
- Have students draw a modeling design for the dog house on an A4 paper. The design is divided into geometric shapes. Measurements and area are calculated with the Pick Theorem.
- Recycling material is collected in boxes.
-The collected boxes are cut into geometric shapes according to the determined dimensions and the floor for the dog house, the walls and the ceiling of the house are created.

-The exterior of the created house is covered with recycling materials to be resistant to weather conditions.
-Painting and writing work is done on the dog house
-The feeding bowl and water bowl are designed and made in the same way.

6.6. Sharing and Mirroring

The shares envisaged by the students are taken into account. From the beginning of this process, feedback is received on the areas where they have developed themselves, learned and focused in line with their interests and abilities.
What are the science concepts you learned and applied in these activities?
What engineering skills did you learn and apply in these activities?
What creative ideas do you have that you need to research and develop more in these activities?

6.7. Evaluation:

● Ask Research Questions. The instructor observes the students throughout the process, prepares questions or rubrics to evaluate the students' understanding of the subject and group work throughout the process.
What are the strengths of the offered product?
What are the weaknesses of the offered product?
Evaluate the product for accessibility and cost.
Share your suggestions to strengthen their weaknesses.
Were mathematical/scientific principles applied in accordance with the design and without errors?
Will the solution suggestions be consistent when associated with daily life?

ANNEX 1
Name and surname:
Step 1: Placing the glasses in the freezer

Glass NO	Material	Freezing Time
1	Styrofoam	
2	Aluminium foil	
3	Cotton	
4	Weather	

● Create a Bar Chart according to the table data. Interpret the chart and take notes. Which material insulated water best and worst?

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Step 2 : Placing glasses in warm water

Glass NO	Material	Melting Time
1	Styrofoam	
2	Aluminium foil	
3	Cotton	
4	Weather	

● Create a Bar Chart according to the table data. Interpret the chart and take notes. Which material insulated the ice best and worst?

ANNEX 2

Name and surname

Colors	Melting Time (Min)
White	
Yellow	
Red	
Black	

1-Create a Bar Chart according to the table data. Interpret the chart and take notes. In what order did the ice blocks melt?

2-Do different colors absorb heat better than others?

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LESSON PLAN 29

- CULTURAL HERITAGE INTANGIBLE CULTURAL HERITAGE (Tales)
- Problem Solving, Reasoning and Proving

LESSON PLAN 29: CULTURAL HERITAGE INTANGIBLE (TALES)

STEAM Lesson Plan
Level : Primary School
Subject: CULTURAL HERITAGE INTANGIBLE CULTURAL HERITAGE (Tales)
        Problem Solving, Reasoning and Proving
Grade: Primary(4th grade)
Duration: 200 minutes (5 lesson hours)
1. Target Outputs:
1.1. Cognitive Process Outcomes:
Central discipline Outcomes:
1. Knows the intangible cultural heritage items
2. Knows the concept of cultural heritage
3. Explains the elements that make up the cultural heritage.
4. Does research about what a fairy tale is.
5. Understands mathematical integrity.
6. Knows the types of scales.
7. Establishes the part-whole relationship between scale concepts.
Outputs from other STEAM disciplines
• Collaborate by working together as a team to solve a problem.
• Pay attention to the details found in many drawings so that you can put a series of images in a logical order. Practice "scale" and changing perspectives by creating your own Zoom-like booklets inspired by a fairy tale.
• Explain relative dimensions (large and small) and lay the groundwork for developing nanoscale understanding in later grades.
• Express the underlying idea of systems thinking - the idea that everything is part of something else.
• Express the underlying idea of perspective - that people see things differently.
• Engineering Connection: Engineers and scientists often work at a wide range of scales - for example, using microscopes to look at individual biological cells and telescopes to look at planets and stars. This introductory activity for very young students starts a new way of looking at things and solving problems. Students act like engineers by paying attention to detail, gaining new perspectives, and realizing that there are many solutions to problem solving. They begin to understand that working as a team can help solve a problem, just as engineering teams work together to solve problems. As they decipher the logical ordering of book pages from micro to macro, they experience the seed of systems that think everything is part of something else.

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1.2. Social product outputs:

● Working as a team
● Communication,
● Ability to share problem and solution-oriented ideas,
● Fulfilling their duties and responsibilities,
● Being able to defend their ideas,
● Presenting the product effectively,
● Understanding the importance of cooperation and collaboration.
● Approaching problems from a new perspective.
● Combining feedback effectively.
● Being able to listen to your friends without prejudice.

2. Materials Used:

·   Torn photos of Istvan Banyai's 31-page picture book Zoom.
(https://www.scribd.com/document/414526961/281569341-Zoom-Activity-Istvan-Banyai#)
• Small blank paper booklets, one per student; made of one to three 4 x 4 inch (~10 x 10 cm) square sheets of paper folded and stapled.
• Pencils, colored pencils or crayons
• Measurement tools such as rulers for students

4. Learning Methods and Techniques

Methods: Problem- Based Learning, Argumentation-Based Learning, Discussion, Question-Answer and Collaborative Working. Creative Drama

Techniques: Brainstorming, Vision Development, Collaboration

5. Groups Considered to be Formed During the Event:

The groups planned to be formed should be included in this section;
The following features should be considered in the Groups created.
*Groups should consist of 2-4 people.
*It should be noted that it is a homogeneous group in terms of level.
* Gender distribution should be equal.

6. Implementation Phase;

1: Preparation Phase:
The trainer invites the participants to the circle. He/she asks them to sit next to each other and says that they will play the game "from ear to ear". Brief information about the game is given. It is not being said, but a creative distortion of a sentence or word. The trainer chooses the words to be used in the game from the concepts of cultural heritage.
Did you anticipate what might happen before starting the event?
So why might we have done this activity?

A short discussion is created by saying that the information spread by word of mouth can change based on the game we play.

2: Presenting the problem situation to the student:

Today you will act like engineers solving a problem. I have an ebook with all pages removed and separated. There are no page numbers or words, just pictures, and the pictures are loaded on our whiteboard. I need your help putting the ebook back together. You will be assigned to a team with the task of working together to put the pages of the ebook in the correct order. This task requires you to collaborate (work together!), think aloud, and use your brain. The name of the book is Zoom. Also, think about why the book got that name as you work together to edit it. In this activity, systems thinking is practiced among teams of students who realize that parts of the pictures on the various book pages are interconnected. The absence of a part of the book changes how you perceive the order of the book. Scale has many meanings. In this activity, scale refers to size and spatial reasoning.

In this process, you may want to guide them with questions such as: "Is this picture on another page of the book?". Doing this helps students see that one image is zoomed in and the other is zoomed out, and they are related to each other, that is, they are part of a system. Expect teams to engage in discussion and students to share their reasoning with team members.

6.3: Getting Information (Leading Questions)

As you walk around, ask questions to help motivate and guide students in need: "How are these pictures connected?" "Do you see a pattern?" Offer praise for observed engagement and teamwork. Pay attention to any behavior and communication that looks like real engineers working together.

In groups, ask students to explain why they put the pages in the order they chose. Encourage listening students to ask questions to fully understand the logic of the presenting team. It can assist the scaffolding to help students explain. Suggested prompts: Why did you put this picture with it? What was your method of organizing them? What did you find difficult?

Explain to the class that another word for zoom is scale. Tell them they will apply the concept of scale by making their own Zoom booklet. Engineers observe from many angles and perspectives and document the details of what they observe in their diaries.

So, is there a part-whole relationship in another tale or story?

6.4: Idea Development

Then the teacher gives information about the tales, which are our intangible cultural heritage. She/he shares an example tale with the students.

Usun's Big Son Segrek

In a country, there is a man named Usun Koca and this man has two sons. The man's eldest son was named Egrek. This boy was a very brave boy. This boy loved to listen to Bayındır Han's conversations and always went to listen to the conversation.

When he came to the chat area, he always sat in front of the vizier. His attitude was not welcomed by other people who came to chat and they thought that he did not deserve his seat. Hearing this, Egrek was upset and decided to go on a raid to deserve his place. He got permission and went out. He besieged Alinca Castle, but the enemies took him prisoner and imprisoned him in the castle's dungeon.

The name of Uşun Koca's younger son was Segrek. This boy grew up and learned that his brother Egrek was a prisoner in the Castle of Altınca. He wanted to free his brother from captivity. When he told his family about this, his family opposed it and they married a girl to prevent Segrek from leaving.

Segrek explained his wish to his wife on the night of the wedding and his wife agreed to let him go. Meanwhile, Segrek told his wife to marry if she could not return, and left the house to save her brother. Segrek went to the castle to save his brother and defeated all the men of the Tekfur. Tekfur understood the gravity of the situation and decided to make the two brothers fight each other. He also informed Egrek that he would be released if he defeated the man in front of him.

The two brothers met at the place determined by the tekfur. Thanks to the kopuz on their waist, they realized that they came from the same lineage and that they were two brothers. Thereupon, they united and fought against their enemies, Tekfur. When they returned home, they were greeted with a feast.

A circle is formed with the students. The instructor asks questions that will create a discussion environment.
What would you do if you were the main character in this fairy tale?

Here, the teacher does drama-story-enactment work with the students.
Did you like the tale/story you played?
So can we change these fairy tales?
How can you ensure that these tales reach future generations?
Have you heard such tales?
Why is it important to preserve these tales?
What are the effects of these tales on the promotion of countries?

6.5: Product development:

In the previous step, create small blank booklets with the students, one for each student. For example, make a booklet with covers and seven (back-to-back) pages using two sheets of 4 x 4 sheets that are folded and stapled. In general, make booklets of 6-10 pages each, but feel free to adjust the number of booklet pages to suit your students' age and abilities.

Distribute a small blank booklet, pencil and ruler/unifix cubes to each student. Tell students: Use these booklets to draw a scene from the fairy tale. Just like in the Zoom book, draw its special scene on each page so it zooms out further on each subsequent page. This means your object will look different on each page due to scale. . Give students about 15 minutes to think about the project for themselves and draw in silence.

6.6. Sharing and Mirroring

Book Sharing: Have students share their books with the rest of the class as an exercise in presenting their work to others.

The shares envisaged by the students are taken into account. From the beginning of this process, feedback is received on the areas where they have developed themselves, learned and focused in line with their interests and abilities. As a result, conduct a discussion session with the class sitting in a circle, preferably outside, giving students time to share their journals with the rest of the class.

What are the science concepts you learned and applied in these activities?

What engineering skills did you learn and apply in these activities?

What creative ideas do you have that you need to research and develop more in these activities?

6.7. Evaluation:

Write the following questions on the chalkboard. After students have finished their Zoom booklet, have them share their answers to the questions and their reflections with another student who has finished the booklet. Walk around while students argue among themselves.

Why is it important to look at things up close AND from afar?

How does your element connect to something?

How has the length of your item changed as you scaled? Move around while students are discussing.

Students can be allowed to play Snap in line with the possibilities. Snap is an interconnected strategy game. Students try to make the tallest dragon that requires them to look closely at the parts and colors.

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LESSON PLAN 30

• Measuring Time

LESSON PLAN 30 : Measuring Time

Lesson: Maths
Topic: Measuring Time
Grade: Primary School 2nd Grade
Duration: 5 Hours

1. Target Outcomes:

1.1. Outcomes Related to the Main Discipline (Maths):
M.2.3.3.1. Reads and shows full, quarter and half hours.
a) Examples of using time over 24 hours are given.
b) The words full time, before noon, afternoon, morning, noon, evening and midnight are used.
c) Analog and digital clock are used together.
ç) Adjustments are made on the clock.

M.2.3.3.2. Explains the relations between time measurement units.
The relations of minute-hour, hour-day, day-week, day-week-month, month-season, season-year are limited.

1.2. Other Outcomes Related to the STEAM Disciplines:
Social Sciences
SS.1.2.6. Plans what he/she can do in Daily life.
Emphasis is placed on the time allocated to tasks such as playing games, studying, resting, sleeping, eating, spending quality time with family and friends, and using mass media.

Maths
M.1.1.1.1. Reads and writes numbers.
Attention is given to the writing direction of the numbers.

M.1.1.1.2. Determines the number of objects in a collection of up to 20 objects (including 20) and writes this number in digits
a) The difference between the digit and the number is highlighted.

b) While counting exercises, it is noticed that the last number said represents the amount of the object.
c) It is ensured to determine the multiplicity corresponding to a number up to 20.
d) By using the expressions "before", "after" and "between", the sequential relationship between numbers up to 20 is understood.

T.1.1.9. Follows verbal instructions.
The steps of instructions should NOT be more than 5.
T.1.4.4. Writes the numbers with right technique.

Visual Arts
VA.1.1.1. Expresses the application steps while creating visual art works.
The process of creating visual art work includes the steps of research, accessing information, observation, determining the material, designing and shaping.
VA.1.1.2. Uses different materials, equipment and techniques in visual art works.
While making the application -to the extent of the student's knowledge level and economic possibilities- it can be emphasized that digital technologies (camera, tablet, smart board, etc.) as well as play dough, clay, paper, dyestuff, etc. are used.

2. Materials Used:

Crayons, cardboard, clock mechanism, cardboard plate, various decoration materials, battery, tablet, internet connection

3. Resources

- https://www.youtube.com/watch?v=nP5DMGyAQmo
- https://www.youtube.com/watch?v=SrEb9NQNpls
- https://www.youtube.com/watch?v=brNyF-gshDs

4. Learning Methods and Techniques

Problem Based Learning Method,
Project Based Learning Method
Techniques; Brainstorming, collaborative work

5. Groups that are Planned to be Established During the Activity:

*Groups should consist of 3-5 people.
*It should be noted that it is a homogeneous group in terms of level.
* Care should be taken to ensure that the gender distribution is equal.

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5E LEARNING CYCLE

GETTING THE ATTENTION:
A discussion environment is created about how they use the time to plan a day by asking questions to students such as:
"How many hours did you sleep today?"
"What activities do you do between what hours of the day (exact hours, morning, noon, evening, and midnight)?"
"What time do you wake up in the morning?"
"What are you doing after you wake up?"
"What are you doing before you go to bed at night?"

DISCOVER:
Note: Student groups must be formed before the activity begins.
Groups of students are asked to write down what they did during a day and to mark the activities they did together during the day. When emphasizing the time, it is stated that they express the exact time, as before noon, in the afternoon, in the morning, at noon, in the evening and at midnight.
Worksheets containing the following questions are distributed:
1. What problems will we face if we do not plan our day? Identify the disadvantages of living without a plan.
2. What should we do to plan our day? What tools do we use when planning the day?
Note: In-group discussion environment is provided for them to find the concept of clock and realize how they should use the clock to solve the problem.
They are asked to create a planning example called "A Student's Day" in which time is planned effectively and efficiently.

EXPLANATION:
The groups share their planning with the class, explaining how they used the time. They explain what they pay attention to when planning a day to make it effective and efficient.
"Sometimes we have trouble balancing our responsibilities and activities in school, home and social areas. To overcome this difficulty, you can take an agenda or turn it into an agenda by writing the date-day in a small notebook. You can record your homework, important days, trips, birthdays or write down our daily tasks by specifying the time on this agenda. You can also hang the big monthly calendar on the wall of your room and take notes there," is explained by the teacher.
The time allocated by the teacher to tasks such as playing games, studying, resting, sleeping, eating, spending quality time with family and friends, and using mass media is emphasized.
By specifying the way the calendar is used, explanations are made such as, "Writing down the activities you have planned for that day, what needs to be done, with

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their duration, and comparing the time passed when the activity is completed, with your estimate, shows you how much time it takes to do certain activities.

We should not forget to specify our priorities while making our planning. Whether your priority is doing homework or playing games, determining and arranging them and specifying the time to be allocated for them are important for effective planning. You can get help from your family elders while trying to distinguish between what you need to do and what you want to do. After preparing a list of things to do that day or that week, and what I want to do, you can set your priorities by putting a star on the things that must be done and a smiley face on the things you want to do.

If we do not plan our time well, we cannot spare enough time for what we want to do.

We cannot fulfill our responsibilities. For example, if we don't do our homework on time, we may not have enough time to play games or spend time with our family.

It is said that if we plan our day, our success will increase, and successful people are those who work in a planned and programmed way. Examples of these people are given. (Ataturk, Aziz Sancar…)

The following explanations are made by telling the students that they will make a clock to plan a day.

It is explained that there are two hands on the clock, the longer one is the minute hand and shows the minute, the shorter one is the hour hand and shows the hour.

When the minute hand shows 12, it is explained that the hour is read as "12" The examples are increased as it is 5 o'clock, 10 o'clock etc…. It is said that the clock is read as "half past" when the minute hand is on 6. Examples are given as half past 3, half past 10…. The full and half hours are shown on the wall clock brought to the classroom.

DEEPENING:

Note: In this section, the design product will be revealed by following the "Engineering Design Processes". The explanations given below in Engineering Design Processes are exemplary. In order for the in-group discussions to be of a kind that will guide the formation of the design, the teacher can follow up and guide.

Design Task: Design a clock that will be used to plan a day.

1-Recognizing the Problem:

How should the numbers on the clock be placed?

What is the function of the hour and minute hands in the clock?

How should the hour and minute hands fit on the clock?

What should be the dimensions of the watch and the length of the hour and minute hands?

What additional actions might be on the clock to help plan a day?

2-Creating Solutions:

The size of the clock is determined by the placement of the numbers on it.

The shape, length and materials to be used of the minute hand and hour hand are determined.

The materials to be used in the main body of the clock are determined.

Additional actions are decided on the clock to help plan a day

3-Planning - Drawing:

Clock design is done on paper.

The materials to be used are determined.

4-Product Creation:

They create the clocks they design as a group from the materials they choose.

The students are assisted by the teacher in cutting or drilling.

5- Testing – Development of the Product:

The groups took turns to show to their friends on the clocks they made;

How many hours they spend playing games during the day,

What hours do they study, etc.?

Suggestions are received to improve clock designs.

EVALUATION:

The groups tell the class about their daily plans on the clocks they make. They read full hour and half hour while describing their daily plans. They explain the function of the minute hand and the hour hand. They explain the importance of living in a planned way.

Note: "Design Product Evaluation Criteria" is given below to be used in the evaluation of the design creation process.

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* Appendix: "Design Product Evaluation Criteria" can be used by the teachers and student groups for evaluation.

DESIGN PRODUCT EVALUATION CRITERIA	Good	Moderate	Can be improved
1. The amount of achievement of the intended goals of the product or invention			

2. The level of following the plan or work steps applied for the construction of the product or invention			
3. The effectiveness and success level of the plan or work steps applied for the construction of the product or invention			
4. What are the strengths of the project plan implemented for the realization of the product or invention?			
5. What are the failing aspects of the project plan implemented for the realization of the product or invention?			
6. What are your suggestions for necessary changes for the realization stages of the project?			