Title of the STEPAM Unit: Re-cycle Balance

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RELATED SUBJECTS	AGE GROUP OF THE STUDENTS	TOTAL ACTIVITY TIME	LEARNING OBJECTIVES DURING THE LESSON SUBJECT-SPECIFIC COMPETENCIES	LEARNING OBJECTIVES AFTER THE LESSON
Mathematics, Science, Physical Education, Engineering, Arts	1-4 grade (6 to 11 years old)	90 minutes	Developing pattern recognition through observations and physical modeling. Experiencing problem-solving in balance. Developing fine motoric skills - balance. Finding connections between different areas, e.g. real-life and mathematics, science	Students can recognize example of balance in everyday situations. Students learn how to measure mass using balances and scales. Students understand more about balance in nature, biodiversity, food chain and the importance of recycling. Students are more successful in maintaining their own balance on different props. The student use to creatively combine different material and design

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OVERVIEW: TOPIC & PURPOSE







In this unit the students measure the mass of various pre-prepared objects made of different materials. They repeat content about balance. Used items are placed in the appropriate bins for recycling material. After that, the students are divided into groups and practice on unstable surfaces one by one. The level of instability of the substrate varies, as do the tasks that become more difficult over time. After that, students practice accuracy by shooting from unstable surfaces into targets (recycling bins). After the exercises, the students stay in groups and use the prepared materials for recycling to make balances, whose functionality they test in practice using the materials prepared in advance. While students present their models, they expand their knowledge with examples

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of scales from everyday life. This story is followed up with content about the balance in nature, also mentioning flamingos. In the final part, students do the Flamingo test - a test for assessing balance. The standardized test is repeated 3 times and the results are added up.

~~Image: 1996- Nobel Laureate in Chemistry, Sir Harold Kroto is teaching Fullerene Geometry at the Symmetry Festival in Delft, The Netherlands. Photo: Kristof Fenyvesi.~~

ACTIVITY PREREQUISITES -

STEAM ELEMENTS

ELEMENT 1: **context presentation**	**What are the examples of scales in everyday life, e.g., seesaws for children, a crane on a construction site, pliers and other types of levers?** **Does it have connections with other subjects? Is it scientifically relevant?** **How we can approach it from the perspective of different characteristics of materials for recycle?**
ELEMENT 2: **creative design**	**Making scale models (using different recycle materials).** **Using different materials in order to bust the creativity in children.** **~~Modifying the models based (number of different recycle materials used) on aesthetic principles.~~** **Using different surfaces for maintain balance – BOSU Ball, Balance bean etc.**
ELEMENT 3: **emotional and social learning**	**Learning cooperation and communication skills through working in groups.** **Experiencing focus and concentration during the building process.** **Learning about Fair- Play and Winning and Losing, and how to respect opponents.** **Learning to persevere and endure in maintaining balance (Flamingo test)**

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STEAM SUBJECT ELEMENTS

STEAM SUBJECTS	SCIENCE	TECHNOLOGY	ENGINEERING	Physical Education	ARTS	MATHEMATICS
SHORT INTRODUCTION TO RELATED SUBJECT ELEMENTS	Learning about the recycling process and natural balance. Recyclable materials: (paper, glass, metal, plastic)	Using electronical devices (Computers, Tablets or Mobile phones) to use app to measure mass.	Learning about the design of scales	**Maintaining balance. Exercises under unstable conditions. precision Games.**	**Creation of original examples of scales using different recycled materials.**	**Learning about mass measurement, use of scales and measuring units.**

SYLLABUS

LESSONS	SUBJECTS	TOPIC OF THE UNIT	LEARNING OBJECTIVES DURING THE LESSON: SUBJECT SPECIFIC COMPETENCIES	LEARNING OBJECTIVES AFTER THE LESSON: STEAM COMPETENCIES

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1	Mathematics Engineering, Physical Education, Science &	Learning about recycling and waste disposal Repetition of content about measuring mass and units of mass. Practicing balance on an unstable ball Learning about stability and center of mass – real life object and sport examples	The students observe, understand and recognize various recycling materials (metal, plastic, glass, paper, electronic waist). Students learn how to preform exercises on unstable surfaces. Students are learning how to measure mass (how to maintain balance). Students are learning about center of mass and fulcrum	The students recognize recycling materials types and places for disposal. Students learn how to properly exercise on unstable surfaces. Student improved their strength, coordination, balance and precision. Students learned to apply knowledge about mass and measurement units in practice. To balance the scales by addition and subtraction.
2	Arts, Science, Mathematics, Engineering, Physical education	Making hands-on models from recycled materials. Modifying models based on aesthetic motives. Repetition of content about measuring mass and units of mass on made models	Students are using their creativity to create previously mentioned scales (different designs, colors). The students are physicaly active and they	The student use to creatively combine different material and design (<>>>>) Students are more active and healthy. Improving their motor skills.

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		Development of motor skill (balance, & coordination). Team work, team building and competition among teams. Learning about the importance of recycling for the natural balance. Process in recycling, Learning about the food chain.	develop their physical skills. They also, learn to work in the team and are involve in team competition. Learning about winning and losing. The students confirm knowledge about **mass and units of mass**. The students confirm knowledge about recycle.	**Students learn how to build different structure using different materials.** **The students recognize geometrical patterns in everyday objects.** **Students learn how to measure mass using balances and scales.**

INSTRUCTIONAL PLAN BY LESSON (COPY AS MANY TIMES AS NEEDED)

LESSON Grade 3-4 Science, Engineering, Physical Education, Art (Language) and Mathematics

TIME PLAN	TEACHING & LEARNING ACTIVITIES	MATERIALS	LEARNING OBJECTIVES
INTRODUCTION **(5-10 minutes)**	Playing an educational game in which students choose objects from different recyclable materials. In each subject, there is a question related to measuring mass and units of measurement for mass, as well as the procedure for measuring	Materials to use: object from metal: Coca Cola can, wires, keys. Plastic objects: different bottles, glasses, boxes. Paper objects: Newspapers, flyers, boxes. Glass objects: glass bottle, glasses, and marbles. Recycling boxes in different colors.	Students learn about materials that can be recycled. They explore how to balance the scales with the chosen materials.

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	mass using balances. Students measure the mass of different objects using scales and appropriate weights. After completing the task, the students put the items into recycling bins of different colors.	Attached PDF slides: Slide nr. 1-6 	
LEARNING ACTIVITIES (60-70 minutes)	Balancing on a board (BOSU ball). The teacher divides the students into groups. He tasks them with investigating how they can achieve balance on the board, as well as how they can get the board out of balance. A game of balance and catch. The students are in a column. Each student stands on the balance board. The task is to catch the ball thrown by the teacher and throw it back to the teacher. A student who fails returns to the	Materials to use to create scales: **(fingerprints, paper towel rolls, falches, plastic plates, etc.).** 	Through modeling and play, students explore the possibility of using recycled materials for making scales. Students practice the ability to maintain balance. They practice to maintain balance in conditions of unstable surfaces.

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	back of the column and tries again until he fails. Make scales. Students are divided into groups of 4-5 members each. They are tasked with designing their scales and making them from available materials.		
WRAP-UP & EVALUATION (15-20 minutes)	Balance test in physical education - Flamingo test. Flamingo in the food chain. Ant on a log.	Mobile app: Link Attached PDF slides: Slide nr. 14-20.	Learning to cooperate in team in order to maintain balance on a beam log. Examples from the environment: seesaws for children, a crane on a construction site, pliers and other types of levers. An interesting story about Archimedes.

EVALUATION PLAN BY LESSON

LESSON	EVALUATION CRITERIA	EVALUATION METHOD
1, 2	Does the student understand / know how a understand how the how the recycling process works in practice.	Pop quiz (connecting recycled colors and materials)
	Did the student construct correctly functional scale using all material?	Observation, comparing products

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	Did the student presented creativity in creating/ crafting objects (used given/suggested art technics)	Observation and evaluation of creativity (technics) art craft.
	Are the students able to present their experiences?	Observation, peer-review of presentation materials
	Is the student able to implement what they learnt?	Creating a project for recontextualizing and adapting the idea (Homework)
	Did the students cooperate with each other in the groups and accepted the results of unstable practices (Fair Play?	Observation, self-evaluation of groups / students.
	Flamingo test evaluation	Test results (seconds)

NOTES -

ACTIVITY SHEETS TO BE LINKED -

EVALUATION MATERIALS TO BE LINKED -

REFERENCES / SUPPORTING MATERIALS TO BE LINKED

PDF / PPT slides:

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