

Didactic Scenario

1. Title

The car propelled by a balloon

2. Keywords

engineering, mathematics, physics, technology

3. Basic Information

STEAM Subject: Renewable energy - The car propelled by a balloon

Typical interaction time with the instructional scenario in teaching hours for in-school work: 1 hour

General description of the scenario:

<u>Phases</u>	<u>Stage</u>	<u>Time</u>
Motivation circle, warm up	preparation stage	10 minutes
Making a mini car from recyclable materials	implementation stage	40 minutes
Introducing and testing mini cars powered by an air balloon	conclusion-evaluation stage	10 minutes

Age group: 9-10 years

Estimated difficulty level:

Very Easy	Easy	Moderate	Challenging	Very Challenging
		X		

Teaching resources

Material:

For a car we need:

- four plastic covers
- a balloon
- a piece of cardboard
- two skewers
- three plastic straws
- tape
- scissors
- a thicker needle

School infrastructure: Interactive board, laptop, video projector

Additional material from external sources/online tools:

<https://www.youtube.com/watch?v=FN7vfYDM3ZY>

https://www.youtube.com/watch?v=ry_9SU0eq9M&t=1s

Differentiated Instruction for students of differing abilities and learning styles in the same class: N/A

Developed by: Primary education professor Rotaru Angela, technology teacher

4. Educational Problem

Students learn to know some important concepts, such as: renewable energy, car, propulsion, recycling, reuse to obtain useful objects.

Students have studied renewable energy in science class, watched educational videos about energy sources, and know that they can make useful products from recyclable materials.

5. Learning Objective (-s)

1. To know renewable energy sources
2. To make a useful product from recyclable materials to be propelled by a balloon;
3. To present the obtained product
4. To carry out measurements within the product testing activity;

6. Phases of the Scenario

Phase 1

Title: Motivation circle, warm up

Indoor	Outdoor	Mixed
X		

Phase duration in minutes: 10 minutes

Detailed description of the scenario phase:

Students watch the film about Energy Sources. The demand for electricity is increasing; we as a society must be prepared and it is necessary to adapt. Sustainable energy actually means renewable energy.

After forming groups, the students are invited to make a car from recyclable materials to be propelled by a balloon as an energy source.

Students learn to know some important concepts, such as: renewable energy, car, propulsion, recycling, reuse to obtain useful objects

Activity sheets: N/A

Phase 2

Title: Making a mini car from recyclable materials

Indoor	Outdoor	Mixed
X		

Phase duration in minutes: 40 minutes

Detailed description of the scenario phase:

Step 1

Cut a rectangle about 20 centimeters long and 10 centimeters wide from the piece of cardboard.

If you carefully analyze the piece of cardboard, you will see that it is a few millimeters thick, and the interior consists of small air compartments. These small compartments will allow you to "build" the two axles of the car, which you will make from skewers and plastic straws.

For the first axis, take one of the skewers and thread it through the piece of cardboard, widthwise, into one of the air pockets. This will help you pierce the cardboard without tearing

it. Insert the other stick next to the first and widen the "tunnel" by gently rotating the two sticks. Do the same for the other axle.
Now insert a straw into each of the two spaces created. Then shorten the sticks so that they are only 5 millimeters longer than the cardboard at each end. Insert a skewer through each straw and shorten them so they are an inch longer than the cardboard at each end.

Step 2

Get your wheels ready!

Make a hole in the middle of the caps and then attach them to the ends of the skewers. The car is almost ready. It only lacks the "engine", i.e. the balloon. Take the third plastic straw and insert one end of it into the flask. Securely tie the neck of the balloon with scotch tape so that no air escapes when you inflate it by blowing through the straw. Now tape the balloon to the car, leaving one end of the straw longer than the car so you can easily blow into it.

Step 3

The car is ready for testing. Blow up the balloon and place the car on the floor, holding the end of the straw with one finger. He takes his finger from the straw and watches the car drive away, propelled by the air coming out of the balloon

Activity sheets: N/A

Phase 3

Title: Introducing and testing mini cars powered by an air balloon

Indoor	Outdoor	Mixed
X		

Phase duration in minutes: 10 minutes

Detailed description of the scenario phase: Students draw conclusions from the observations they made and present the resulting.

Activity sheets: N/A

7. Evaluation Methodology

The evaluation will be done with the help of kahoot.it

Play kahoot.it

<https://create.kahoot.it/details/0d567060-4b4f-472b-8e5b-1413c471b54d>

8. Additional Resources for the teacher

N/A