

SCENARIO	
Title	The principle of conservation of mechanical energy.
Summary	The goal is to familiarize students with the principle of conservation of mechanical energy.
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Didactic objectives	
<p>General objectives:</p> <ul style="list-style-type: none"> - familiarizing students with the content of the principle of conservation of mechanical energy, - analyzing energy changes in everyday situations. <p>Specific lesson objectives:</p> <p>Students will be able to:</p> <ul style="list-style-type: none"> - name the energies possessed by a given body at a given moment, - explain how the energies of the body change during ascent and descent, - indicate examples from the environment of changes taking place, - analyze energy transformations occurring in various situations, - Determine when energy reaches maximum and when minimum values. 	
Physics <input checked="" type="checkbox"/> Mathematics <input type="checkbox"/> Information Technology <input type="checkbox"/> Robotics <input type="checkbox"/> Programming <input type="checkbox"/>	
Education Level: 10-12 years <input type="checkbox"/> 12-14 years <input checked="" type="checkbox"/>	
Problem Statement	
When is mechanical energy saved? How does mechanical energy change during free fall? What energy losses will occur?	

BOM (Bill Of Materials needed)

- Computer position
- SCRATCH environment or Internet access installed
- mathematical pendulum
- rubber ball,
- screw toy - toy car.

Activity description

Lesson flow:

1. Organizational and organizational activities
2. Introduction to the topic - a reminder of news on energy and various forms of energy.
3. Introduction and explanation of the concept of isolated body system.
4. Discussion of free fall,
5. Introduction of the principle of conservation of mechanical energy
6. Discussion of other possibilities of energy transformation.
7. Performing an experiment showing the transformation of potential energy of a falling body into other forms of energy.
8. Discussion of energy losses occurring during the decline.
9. Simulation in free fall SCRATCH environment.

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```
when clicked
  set h1 to 0
  set loss[%] to 0
  set size to 50 %
  go to x: -180 y: -100
  ask Enter the height and wait
  set h to answer
  set h1 to h
  ask Give energy loss (%) and wait
  set loss[%] to answer
  broadcast komunikat1

when I receive komunikat2
  say join Thep hysical body will rise to height  $h1 * 100 - loss[\%] / 100$  for 2 secs
```

```
when I receive komunikat1
  go to x: 43 y: -160
```

10. Problem solving.

11. Summary and end of the lesson.



```
when I receive komunikat1
set size to 40 %
set g to 10
set t to 0
forever
  go to x: 70 y: h - 150
  change h by g * t * t / -2
  change t by 0.01
  set height to sqrt of y position + 150 * y position + 150
  if touching Duszek ? then
    forever
      go to x: 70 y: h - 150
      set height to sqrt of y position + 150 * y position + 150
      change h by g * t * t - g * t * t / 2
      change t by -0.01
      if y position > h1 * 100 - loss[%] / 100 - 150 then
        broadcast komunikat2
        stop all
```

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Resources

- computer stadion
- SCRATCH environment installed or Internet Access



Students' Evaluation

The student will be assessed for commitment and proper performance of experiments.

Bibliography

Spotkania z fizyką - Podręcznik do fizyki dla klasy siódmej szkoły podstawowej

Authors: Grażyna Francuz-Ornat, Teresa Kulawik, Maria Nowotny-Różańska

<https://scratch.mit.edu>

Scalability

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Script modification and improvement.

More information

Solving tasks using the program.

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