ICT in SES

Example project in Physics

Lesson №26

Demonstration

Demonstration

Example project „Ballistic cannon“

- Minilesson
- Interactive part
- Instructions
- Problems
- Solutions

Ballistic cannon

• Ballistic cannon •

Demonstration project | Pavel Boytchev | 2015 (translated 2020)

• Ballistics •

Ballistics is a part of Physics that deals with the movement of a body that is thrown into space. In the simplest case, it is assumed that: (a) only the force of gravity acts; (b) no air resistance or jet propulsion affects the body; and (c) the surface of the ground is flat.

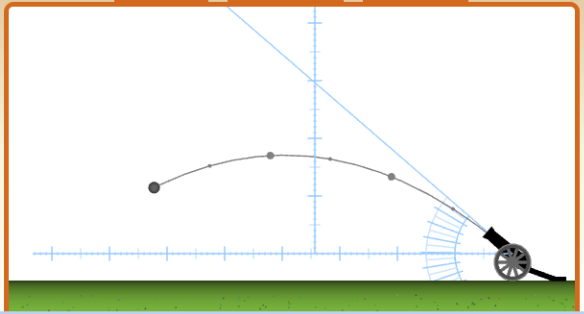
We will consider the movement of a gullet fired from a cannon. The trajectory and movement of the gullet are described by formulas with three parameters:

1. **v** – initial speed
2. **g** – acceleration of gravity;

Ballistic cannon

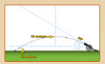
• Field experiment •

New Shot | Measurement | Instructions



Ballistic cannon

Solution. Switch to "Measurement" mode, adjust the cannon direction at the appropriate degree and fire a shot. With the vertical line measure the height of the flight, and with the horizontal line measure the length of the flight. The results of the measurements and the calculations are shown in the table.

Angle	Measured data			Calculated data	
	Height	Distance	Image	Height	Distance
30°	10 m	69 m		9.99 м	69.21 м
60°	30 m	69 m		29.97 м	69.21 м
90°	40 m	0 m		39.96 м	0.00 м

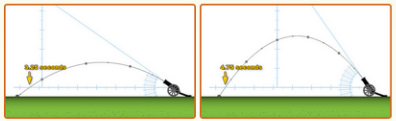
Ballistic cannon

$$D(45°-\alpha) = v^2\sin(90°-2\alpha)/g = v^2\cos(2\alpha)/g$$

and

$$D(45°+\alpha) = v^2\sin(90°+2\alpha)/g = v^2\cos(2\alpha)/g$$

When measuring the flight duration at angles **α=35°** and **α=55°**, we get different times – **3.25 seconds** and **5.75 seconds**. Observation shows that a larger angle results in a longer flight.



From the formula for the flight duration and from the monotonic growth of

TRY IT

Discussion

The end

Comments, questions