(ENG) Flying Marshmallows

Introduction

#Online activity #In-class activity #Inquiry-based learning #Experiential learning #Simulation #Art Work

The pupils will make a very simple catapult to understand the description of forces.

Learning Objectives

- [ ] understand the concept of forces

ACTIVITY DETAILS

Activity Details

Connection of the activity with Art

Leonardo da Vinci's art.

Link to local, national School Curriculum

Forces/ Description of forces

Equipment required

- 3-10 craft sticks
- 1 small plastic spoon
- 2 rubber bands
- 3-100 marshmallows
- Internet connection

Duration of activity

45 minutes

Additional material

- https://www.discovermiddleages.co.uk/medieval-weapons/the-catapult
- https://www.britannica.com/technology/catapult-military-weaponry
- https://gosciencegirls.com/catapult-stem-project/

Step 1 - Motivational Stage

Reflect on the following question

"How far can the pupils fly a marshmallow using a device made of a spoon, some sticks, and rubber bands?"

Step 2 - Investigational Stage

Explain to pupils how a simple catapult works: it utilizes stored energy created by torsion and tension. In addition to gravity, the trajectory of the projectile is affected by air resistance in particular.

Instructions can be found, for example, here:

LINK

STUDENTS' TASKS (Part 1)

1

Task 1

The pupils tie a small spoon on top of a craft stick and tie a rubber band on the end of them.

2

Task 2

They stack the remaining sticks and stick them close to the rubber tie on the end of the spoon and one stick. Then they tie a rubber band so that the stack is firmly set.

3

Task 3

Finally, the pupils tension the catapult by turning the throwing arm (spoon) backwards, causing the rubber band to tension. When the throwing arm is released, the projectile - the marshmallow - is thrown forward.

STUDENTS' TASKS (Part 2)

Task 4

Tell pupils that according to Newton's laws, the forces must always be in balance

- force and counterforce
- the acceleration or deceleration of the object receiving the forces

Stages of Catapult Shooting

Discuss about the three stages of the catapult shooting.

Step 1

Step 1

Strengthening the catapult: there is force with which you press the spoon with your finger, and the tension force on the rubber band.

Step 2

Step 2

Catapult releasing the marshmallow: forces are accelerating because the restored force and released force are no longer in balance.

Step 3

The marshmallow flying: the speed of the marshmallow is slowing down, because it is affected by the air resistance and the gravity

5

Task 5

Next task is for faster pupils.

The pupils are asked to investigate how Leonardo da Vinci improved the basic idea of a catapult by using more tension with ropes and arms.

Source link:

LINK 1

Step 3 - Consolidation Stage

The pupils compare their results on how far they can make the marshmallows fly.

End of the activity

EXIT