Experiment Share - Saturday November 6th 2021 17:00 CET (Paris time)

Recording of Zoom session: https://youtu.be/MvXm83_E6YA

Link to this document: https://tinyurl.com/experimentshare-nov6

Proposed Order of Experiments

Marco Kirschner - Germany - Two experiments with mirrors

Giulia Realdon - Italy - Ocean currents through straits (The Marsili's Tank)

Nicoleta Cindea - Romania - Dry heat sterilizer

Panagiotis (Takis) Lazos - Greece - Pythagoras' (or Tantalus') Cup & Dancing Filament

Astrinos Tsoutsoudakis - Greece - Tensegrity and Barton's Pendulum

Michael Gregory - France (currently in Greece) - Beer-bottle Thermometer

Andrea McPhee - Canada - Uniform Force, Uniform Motion?

Marco Kirschner - Germany - Two experiments with mirrors

Description
1st: making a „hologram" projector, 2nd: One lamp, one finger, two shadows

Materials
1st: Transparent Film from projection unit, scissors, transparent tape, smartphone.
2nd: small mirror, flashlight

Link to slides with more information, photos and diagrams:
https://drive.google.com/file/d/1qpDnU2rKeAEOKfKMv_tAveqHLtvAgMut/view?usp=sharing

Giulia Realdon - Italy - Ocean currents through straits (The Marsili's Tank)

Description

Model the flow of seawater of different densities through straits.
This activity addresses several concepts within Earth sciences (concentration, density, diffusion) by means of modelling typical of a science investigation, with an example taken from the age of the Scientific Revolution.

Materials

• a rectangular transparent storage box (volume about 4 litres)
• a smaller kitchen box (e.g. Tupperware™ type) of similar height that fits inside the larger one with an opening cut in the upper side and another one cut in the lower side
• a cutter to make the openings
• food colouring (two colours)
• a syringe without needle, of at least 60 ml, connected to plastic tubing about 20 cm long
• salt
• kitchen scale or electronic balance

The protocol for performing this activity can be found here:
https://www.earthlearningidea.com/PDF/315_Marsilis_tank.pdf

Nicoleta Cindea - Romania - Dry heat sterilize

Description

The dry heat sterilizer is advantageous in multiple ways, not only for the environment, but also for your wallet. It was designed with accessibility in mind, as the parts required to construct one only amount to one US dollar, or can be recycled from scraps. Not only that, but it also allows us to reuse the masks, and thus prevents plastic pollution from reaching our waters and land. It's materials are also almost entirely biodegradable, or present little toxicity. The 12V battery power supply could also be used together with a solar energy source, again, making this sterilizer an excellent option both for the world around us, and for your savings.
This was made by the regional robotics teams from our areas and take gold in the competition FIRST GLOBAL 2021 Awards Ceremony revealed:
🥇Team ROMANIA 1st place - Health CATEGORY
🥇Mircea Nistor - Outstanding Mentor
CONGRATS to all FTC robotic teams from Hunedoara County coordinated by RobotX_HD and RobotY_HD.
Sky is not the limit!

Materials

Panagiotis (Takis) Lazos - Greece a. Pythagoras' (or Tantalus') Cup
b. Dancing Filament

a. Description

Let's make a simple Pythagoras cup!

a. Materials

a. A (preferably transparent) plastic cup or bottle
b. A length of flexible plastic tube (around 25 cm)
c. Hot glue

Alternatively you could 3d-print such a cup: http://ekfe-ilioup.att.sch.gr/?p=840

b. Description

The long filament of an incandescent bulb, powered by AC voltage, rigorously vibrates when a magnet is nearby.

b. Materials

a. A neodymium magnet
b. A "vintage" incandescent bulb like these:

Michael Gregory - France (currently in Greece) - Beer-bottle Thermometer

Description

Find happiness in an empty bottle… and in one of my all-time very favourite experiments! I'll show you how to use an empty bottle and a couple other simple materials to make a gas thermometer. If time permits, I'll also go over calibration and extrapolation to calculate and estimate for absolute zero!
Link to full instructions: https://tinyurl.com/MFE-Thermometer

Materials

Empty glass bottle (beer, wine, juice, etc.)
One-hole stopper of suitable diameter for bottle*
Balloon
Plastic Drinking Straw
Water (may be coloured for better visibility)

*can be made from a wine cork, beer cap, etc., though it may be difficult to get a tight seal

Andrea McPhee - Canada - Uniform Force, Uniform Motion?

Description

A fun, whole class way to introduce Newton's laws of motion, specifically N1. One student sits on a giant motion cart, while another student pulls them with a bungee cord stretched at a constant distance. The rest of the class times how long it takes for the

Materials

Giant motion cart: I made mine from a 92.5 x 61 x 5 cm board and the wheels from two skateboards
2-3 bungee cords
timers
masking tape or other way to mark out the start, 2 m, 4 m, and 6 m points
enough timers for the class
student volunteers

Alternate versions: fan cart or Fletcher's trolley, anything that is pulled/pushed with a constant force where the net force is not zero.

[My marks are due Nov 15, so I'm a bit swamped at the moment, but check back here after that date; I will post links to everything I showed you. I will also blog about it in detail at andreamcphee.blogspot.com]

Other links to share:
Resources, projects and points of connection...

Scientix
http://www.scientix.eu/

Science on Stage
https://www.science-on-stage.eu/

Perimeter Institute - Classroom Resources
https://resources.perimeterinstitute.ca/

CERN Teacher Programs
https://teacher-programmes.web.cern.ch/international-high-school-teacher-programme

Exploratorium Teacher Institute
https://www.exploratorium.edu/snacks

DDD
https://dddivulgar.com/

https://www.earthlearningidea.com/

http://www.sciencephysics4all.com/arthra/i-koupa-tou-pythagora