

# The Daily STEM

Student's favourite newspaper

January 2017

Anniversary edition related to the eTwinning project "THE DAILY STEM"

<https://twinspace.etwinning.net/25110/home>

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## Happy new year

(Roungos George)

May this year bring new happiness, new goals, new achievements and a lot of new inspirations on your life.



## Phototropism

(Year 8 - Larramendi Ikastola - Basque Country)

We try to emulate Darwin doing some phototropism experiments. Darwin noticed that if light is shone on a shoot tip from one side, the shoot bends and grows toward the light. The "bending" didn't occur in the tip itself, but in the elongating part just below it.

We plant some canary seeds and less than a week later some shoots sprout. They grow covered by a cardboard box. After they sprout, we carry out three different treatments:

1. Remove the tip to some shoots.
2. Cover some shoots' tip with foil.
3. Some shoots under no treatment at all.

We make a hole in the cardboard box, letting the sun come inside.

Expected results: Removing the tip or covering it with foil mean that the shoot could no longer "bend" toward the light. We don't observe this,

## Laws of gases: Boyle's Law

(Mikel Ortega, Jia Hui Xu, Janire Uriarte and Izaro Orbe - Larramendi Ikastola - Basque Country)

Boyle's law states that in a closed system pressure and temperature are inversely proportional.

Equipment: a large syringe + water balloons.

1. Blow up a water balloon (it has to fit inside the syringe)
2. Drop the balloon inside the syringe.
3. Place the plunger on the end.
4. Place the plunger at the highest point of the syringe and cover the opening bottom with your finger.
5. Press the plunger down and observe.
6. As pressure increases, volume decreases.



Here you can see [the video](#)

## Origami- Tangram

(Ali Murat ÇiVi-Turkey)

On the door of Platon Academy it is read "Those who don't know geometry are not allowed to enter".

In modern usage, the word "origami" is used as an inclusive term for all folding practices, regardless of their culture of origin. The goal is to transform a flat sheet square of paper into a finished sculpture through folding and sculpting techniques.

Below is a list of just some of the benefits of using origami.

Visual Motor

- \* Temporal Spatial\* Logical Reasoning
- \* Concentration\* Math Concepts
- \* Geometry\* Proportion\* Fractions
- \* Symmetry\* Problem Solving Creativity
- \* Self Confidence\* Manual Dexterity

Origami video

<https://www.youtube.com/watch?v=ltrViCOeW84&t=88s>

## Tangram

A traditional Chinese puzzle made of a square divided into seven pieces (one parallelogram, one square and five triangles) that can be arranged to match particular designs

Tangrams are a great thing to incorporate into the mathematics classroom because they are fun, interesting, and meaningful. Tangrams "help students develop mathematical concepts of fractions, spatial awareness, geometry, area, and perimeter"

because a really bad weekend ruin our experiment, due to heavy rainfall. Here you can see some pictures:



1. Place the plunger at the lowest point it can be, without touching the balloon.
2. Place your finger over the opening in the bottom of the syringe.
3. Pull the plunger upwards and observe.
4. As the pressure decreases, the volume increases.



Here you can see [the video](#)

## Labour and breastfeeding

(Ana Belén López de la Franca Abad and Marcos Morugán González - CEIP José María de la Fuente - Spain)

The labour is a special moment for a mother, because her baby is going to be born. A pregnancy consist of fertilization, when an egg cell lets a spermatozoa to enter in and creates a zygote, then it passes through the Fallopian tubes and attaches the uterus. It takes 9 months, but it depends on the baby, who can be born after or before that time. In the first month, the zygote matures and transforms into an embryo and by the third month is already a foetus. The three stages of labour are:

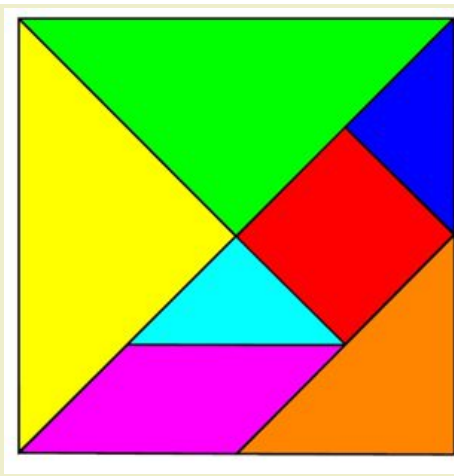
1st) When regular contractions in the uterus appear and the amniotic liquid is expelled.

2nd) When the mother pushes and the baby is born.

3rd) When the placenta is expelled.

Breastfeeding is the period of time when the mother's breast produces milk.

The WHO (World Health Organization) recommends breastfeeding for a minimum period of two years, and exclusively during the first six months. If the baby don't accept the mother's milk, he or she should be feeded with formula milk. The milk from the mother contains cells, so it is an alive drink!



## Cartesian diver

(Junior High School of Thermi)

Every mustard portion has an air bubble which will be compressed when we squeeze the bottle. The density of the portion will change and the portion goes down. Thank you [#Hellmans](#)



[goo.gl/1g8Ex1](http://goo.gl/1g8Ex1)

## Terrarium

(Liceul Tehnologic I.V.Liteanu/ Cristian and Cosmin 10C)

1. What is a terrarium? Terrariums are usually sealable glass containers containing soil and plants, and can be opened for maintenance to access the plants inside.

2. Why are plants still alive in the container? Because the container is transparent, which allow the light and heat to reach the plants. Also the terrarium is sealed that and the heat





## 10000 Volts!!!

(Junior High School of Thermi)

Electrons jump from the one nail to the other because of the high voltage.

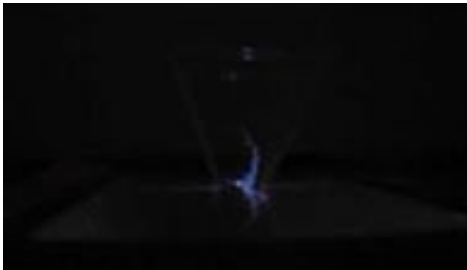


<https://www.youtube.com/watch?v=d9HPDoomStg>

## Holograms

(Junior High School of Thermi)

....with a cd case!

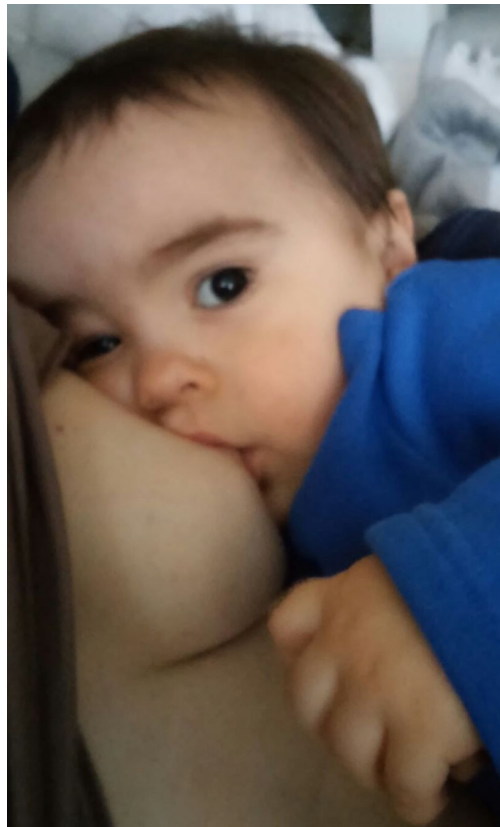
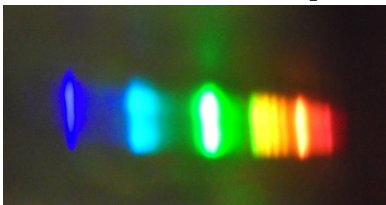


<https://www.youtube.com/watch?v=usZly8E5qsE&feature=youtu.be>  
<https://www.youtube.com/watch?v=SKIdY-cOAzO>

## DIY spectrometer

(Junior High School of Thermi)

Fluorescent light bulb's spectrum with a DIY cd cardboard box spectrometer



## Resonance...

(Junior High School of Thermi)

...in physics is called a phenomenon in which a forced oscillation frequency is equal to the natural frequency of the oscillator, thereby maximizing the width.



<https://www.facebook.com/100009419523080/videos/1775799692743998/>

## Altitude and pressure

(Izaro Orbe - Larramendi Ikastola - Basque Country)

I took a plane and I felt thirsty. Therefore, I bought a bottle of water. I drank half of the water.

When we landed and I observed the bottle of water, I saw that it was squeezed. The reason is that the

helps the water vapors to condense on the walls creating small water drops which eventually will go in the soil creating a mini water cycle. With transparent walls, light can get into our terrarium as we mentioned earlier and it helps the plants to make photosynthesis and to grow and keep staying alive.

### 3. How to maintain a terrarium.

Maintaining a terrarium it's easier than it seems like. If it's a closed terrarium, you have to open it once a week and remove the moisture from the walls because the excess of moisture on the walls which can create mold and it will damage the plants.

4. How to create a terrarium For that we will need just a few things: -an empty light bulb or a glass bottle, -a plant (moss is recommended), -really small stones (on the bottom of our terrarium they will act as a drainage), a layer of sand (level it on the stones)



soil (place it over the sand)



add the plants, last but not least some water drops, seal the terrarium and we're done!





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

## Building a skeleton

(Year 12 - Larramendi Ikastola - Basque Country)

In our anatomy class, we place all the bones in its place in order to construct the entire skeleton. The students take happily and willingly part in the activity. We are going to use the skeleton in order to learn all the bones' names and the types of joints as well.

Here you can see some pictures:



atmospheric pressure is lower when the altitude is higher and the opposite.

The air inside the bottle of water was from the plane and the air outside the bottle of water had a higher pressure than the one that it's inside. Hence the bottle of water was squeezed.



## How to blow up a balloon inside a plastic bottle

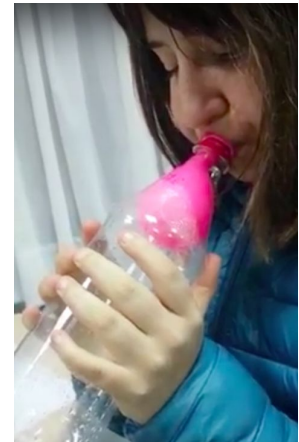
(Garazi Korraletxe, Markel Arrieta, Aiala Sanz, Olaia Gallastegi, Erkuden Kamiruaga, Imanol Arana and Unai De Miguel - Larramendi Ikastola - Basque Country)

At first the balloon could be blown up not too much, because the air inside the plastic bottle could not be compressed any more.

After that, the plastic bottle was perforated by six needles, but the needles were not removed.

While a person was blowing up the balloon, another one was taken the needles away.

We can see that the balloon blown up a lot, because the compressed air left the plastic bottle and the balloon had enough room to be blown up widely.



Here you can see [the video](#)





## Prime numbers

( A2 Class – 1st Junior secondary School of Xanthi - Greece)

A prime number is a natural number that has exactly two distinct natural number divisors: 1 and itself. For example, 17 can be divided only by 17 and by 1.

Some facts:

- The only even prime number is 2. All other even numbers can be divided by 2.
- If the sum of a number's digits is a multiple of 3, that number can be divided by 3.
- No prime number greater than 5 ends in a 5. Any number greater than 5 that ends in a 5 can be divided by 5.
- Zero and 1 are not considered prime numbers.
- Except for 0 and 1, a number is either a prime number or a composite number. A composite number is defined as any number, greater than 1, that is not prime.



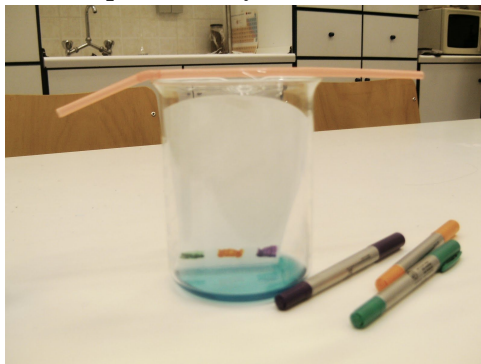
## Discover the hidden colours

( B3 & B4 Class – 1st Junior secondary School of Xanthi - Greece)

For this experiment we used: filter paper, permanent markers, a beaker and some alcohol.

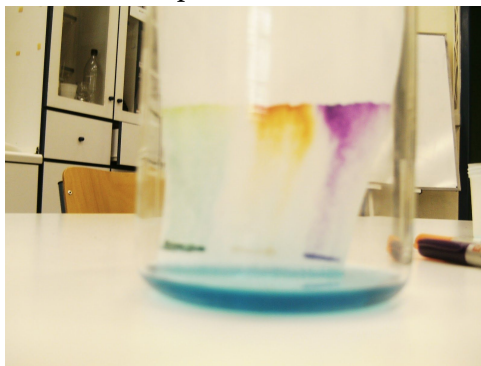


We cut a coffee filter into a strip that fitted the beaker and placed a line using each marker near the bottom of the strip. We put our lines up high enough to submerge the bottom of the paper without submerging the line and secured the strip vertically in the beaker.



We put alcohol in the beaker, enough for the filter paper to soak up. The bottom of the strip was submerged, but not the marker lines.

We waited patiently. As the alcohol moved up the filter paper we saw the different compounds in the marker.



**Why did ink separate into many colours on the paper filter?**

## The smiling Carbon dioxide

(Junior High School of Monte Sant'Angelo-Italy (6th grade class B)

What happens when you put an acidic substance, such as vinegar and sodium bicarbonate (baking soda ), in contact with each other? You can understand it with this simple experiment.

Pour some vinegar in a bottle; use a funnel to insert about three teaspoons of baking soda in a balloon.

Then place the balloon on the neck of the bottle being careful not to mix the two substances together.



Finally put the balloon in an upright position so as to bring down the vinegar in the baking soda.

What can you observe? As soon as the baking soda gets in contact with the vinegar, it develops a strong effervescence and, gradually, the balloon inflates turning into a smiley face (Which we had previously drawn with a permanent marker). How can we explain this phenomenon?

The vinegar, which is an acidic substance, in contact with the baking soda, reacts chemically and produces carbon dioxide which is a gas.

As we well know, the gases are less dense than the liquids. Therefore the carbon dioxide tends to rise into the bottle and collects itself in the balloon which consequently swells.

On the bottom of the bottle you can see a whitish powder; this new substance is sodium acetate which derives from the chemical transformation of vinegar, whose acidity was neutralized by bicarbonate.

## MILK AND SOAP: COLOR SWIRLS

Junior High School of Monte Sant'Angelo-Italy (6th grade class A)

The colored water molecules and those of fats compete to dance with the detergent molecule and from this dance WONDERFUL COLOURED VORTEXES come out! Try. You need: milk, yogurt, dish detergent, food coloring, two dishes and some cotton buds.



### **MILK:**

**FAT (HYDROPHOBIC )- WATER (HDROPHILIC) - PROTEIN – SUGAR - MINERALS (CALCIUM AND PHOSPHORUS)...**

### **YOGURT:**

**FAT - PROTEIN - SUGAR - MINERALS (CALCIUM AND PHSPHORUS) – PROBIOTICS**

Pour into a dish milk and in the other yogurt; to the center add a few drops of three or more colours. Then take a cotton bud, wet the tip in the detergent and soak it in the stain color and ... "the dances begin", the COLOR VORTEXES quickly move in the milk, astonishing everyone.



Most ink is actually a mixture of different inks and can be separated into its individual components.

As the alcohol creeps up the paper, the ink mixture begins to separate and the individual inks that make it up behave according to their individual properties. Some components of the ink travel farther than others, causing the different colours to spread out so we can see them. This is called **Chromatography**.



## LET'S DISCOVER THE HIDDEN COLORS

Junior High School of Monte Sant'Angelo-Italy (6th grade class C)

Do you want to create artistic paper towels? Try this experiment. Take three glasses full of water, three paper towels, three markers (magenta, blue and black).



Draw a circle with a water-soluble marker and immerse the center of the paper in the water placing the handkerchief on the glass. As you can see the handkerchief gets wet and simultaneously the colors spread. The pigment is only one in the primary colors, there are two in the secondary ones and more than two in the black one. What a wonderful explosion of colors!







If you repeat it in the yogurt, nothing will happen.



Why? You may wonder... it is easily explained

If you introduce fat, soap and water in the milk, these ingredients are attracted towards the soap and they create whirling movements. On the contrary in the yogurt, where there is no water, this phenomenon does not happen.



We want to explain why it happens: by capillary action, the water spreads along the paper, transporting the colored pigments; among these the smaller ones are faster and the larger ones are slower. Try it yourself and tell us your opinion.