

# WinS 2018 AMONA'S POWER

Liquid concrete

## Materials

Salad bowl  
Spoon  
Maizena (fine corn flour)  
Cup  
Water

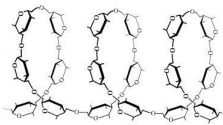
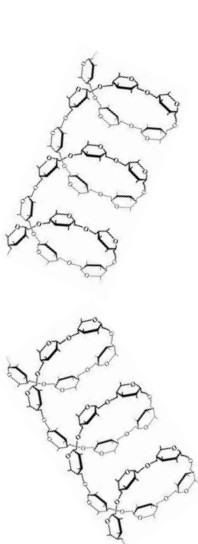
## Procedure

Pour two cups of maizena in the salad bowl. Little by little, start adding water, mixing the two ingredients slowly until you get a homogeneous mixture.

## What is This?

You have just “cooked” a NON NEWTONIAN fluid. Try to punch its surface. It is like a solid! Introduce your finger slowly. It is like a liquid! It is two things at the same time!! HOW?

The reason lies behind its composition. Maizena, natural and homemade, is composed by starch. Starch is a natural “polymer” material, which resembles a plate of spaghetti (long chain molecules). Such spaghetti-like material is intertwined and traps water inside. Penetrating into such “soup” of spaghetti is difficult if we try to do it quickly. However, if we do it slowly, the spaghettis have time to move, accommodate, letting us to get into. This is why sometimes maizena behaves as a solid, and sometimes as a liquid.



# WinS 2018

## AMONA'S POWER

Medium or small  
coffee?

### Materials

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Express pot  
Polyspam coffee cup  
Small metal colander  
Water  
Heating source

### What has happened to the cup?

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Surprise! Did you think that it will explode or melt...? The result is a mini-version of the original cup! The cup has shrunk! The cup is made of "polyspam", a very common packaging material.



### Procedure

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Place the small metal colander inside the express pot. Place the polystyrene coffee cup on top of the colander. Pour up to one finger of water inside. Close and heat up the express pot until it makes noise. Keep the pot under pressure for 15 or 20 minutes. Cool down and open.

Its scientific name is expanded polystyrene. This material is a polymer "a plate of intertwined spaghettis" with large cavities of air inside. As we heat the pot, the water inside the pot evaporates, and the pressure increases. The pressure forces the release of the air trapped inside the "expanded" spaghetti network. As a result, the cup shrinks drastically, as you have seen, but keeping the polymer, the "spaghetti network", intact.



# WinS 2018

## AMONA'S POWER

Milk canvas

### Materials

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Whole milk  
Plate  
Food colouring\*  
Fairy soap  
Ear swab

\* Trick: it has to be liquid. Gels cannot be used

### Procedure

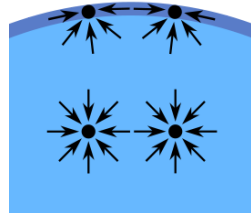
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Pour whole milk to cover the bottom of the plate. Add droplets of food colouring on different spots. Wet the ear swab slightly with fairy soap and touch the milk surface with it.

### What has happened?

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At the milk surface, as it occurs to water and other liquids, there is a force that we call "surface tension". This tension "creates" an effect similar to having an elastic bed on top of the liquid surface, which allows small insects and reptiles to "walk" on.



The tension appears because of the interactions between the surface of milk and the surrounding air. When we touch this surface with soap, we make the superficial tension of the milk disappear. Soaps are "surfactant molecules" or "balls", which quickly spread out on the surface of the milk making the tension disappear.

The fast and energetic movement of these "surfactant balls" push the food colouring molecules (which can also be seen as balls) rapidly towards the edges of the plate, making this beautiful figures and shapes.



# WinS 2018 AMONA'S POWER

## Magnifying water

### Materials

Laser pointer  
Tip of a pen (where the hole is)  
Cello-tape  
Dirty water, saliva

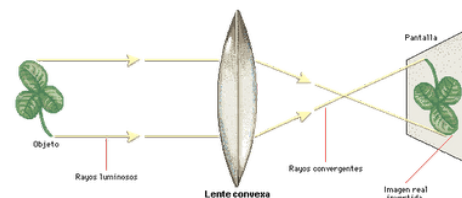
### What has happened?

You have fabricated a homemade optical microscope! The only thing you need is a light source and a magnifying glass. In our case, the laser is the light source, and the droplet of water inside the pen tip acts as both magnifying glass and sample holder.

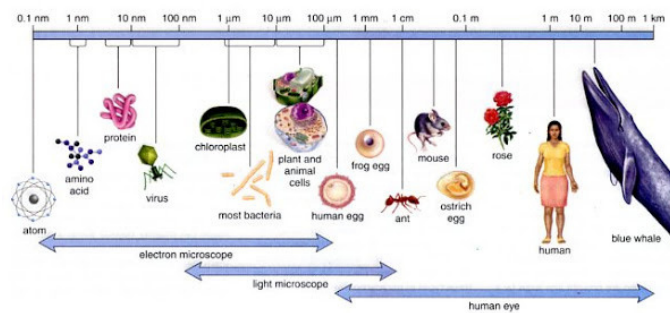
### Procedure

Cover the tip of the laser pointer with the tip of the pen, and fix both parts with cello-tape. The tip of the pen will serve as a mini-water container. Wet the tip of the pen with dirty water from a pond/puddle or equivalent (very dirty!!). Switch the laser pointer on and point towards a white floor, wall or table.

This microscope allows us to magnify the size of an object 10,000 times! So we can see microorganisms, "tiny, tiny bugs".



Nowadays, there are non-optical microscopes, which can be used to "see" atoms!



# WinS 2018

## AMONA'S POWER

### Egg balls

#### Materials

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Eggs  
Vinegar  
Transparent container with a lid

#### Procedure

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Place the eggs in a container and dip them in vinegar. Close the container and keep it, as it is 24 hours.

#### ¿Qué ha pasado?

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24 hours later, the eggshell will disappear, leaving a “bare” egg behind, only protected by a thin and elastic membrane. This membrane is semi-transparent, so we can see the egg yolk inside!

Eggshell is composed of calcium carbonate ( $\text{CaCO}_3$ ).

This mineral, salt, reacts with the acetic acid of vinegar. When this reaction occurs, calcium carbonate transforms into a new compound, which is water-soluble. As a result, the eggshell “disappears” little by little.

The bubbles you see are another product of the reaction, a gas named carbon dioxide ( $\text{CO}_2$ ).

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# WinS 2018

## AMONA'S POWER

No pressure

### Materials

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Boiled and bare egg  
Glass bottle such that a boiled egg can stand on the bottleneck  
Alcohol  
Toilet paper  
Matches

### What has happened?

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When the flame disappears, the egg is “sucked” inside the bottle. Several things occurred while the paper was burning. The oxygen inside the bottle is consumed rapidly.

The remaining air inside the bottle, and gases evolving from the burned paper are heated up very quickly by the flame, the pressure increases, and part of the air escapes outside the bottle.

### Procedure

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Wet a chub of toilet paper in alcohol and place it inside the bottle. Light the match and through it inside the bottle. Place the egg rapidly on top of the bottleneck, “covering” its entrance.

As a result, we have less air inside! When the bottle cools down, the remaining air shrinks and the pressure drops inside. This pressure drop is so big that is able to suck the egg and also air from the outside.

### How can we suck the egg out?

Blow air inside! Blow strong with the bottle tilted up and covering the entrance of the bottleneck with your lips. You will see how the egg comes out. You are increasing the pressure inside the bottle, so everything inside wants to escape again!

