Lab book

Anna Victoria Jeffery

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Danny Monzel

Elisha Ohlmann

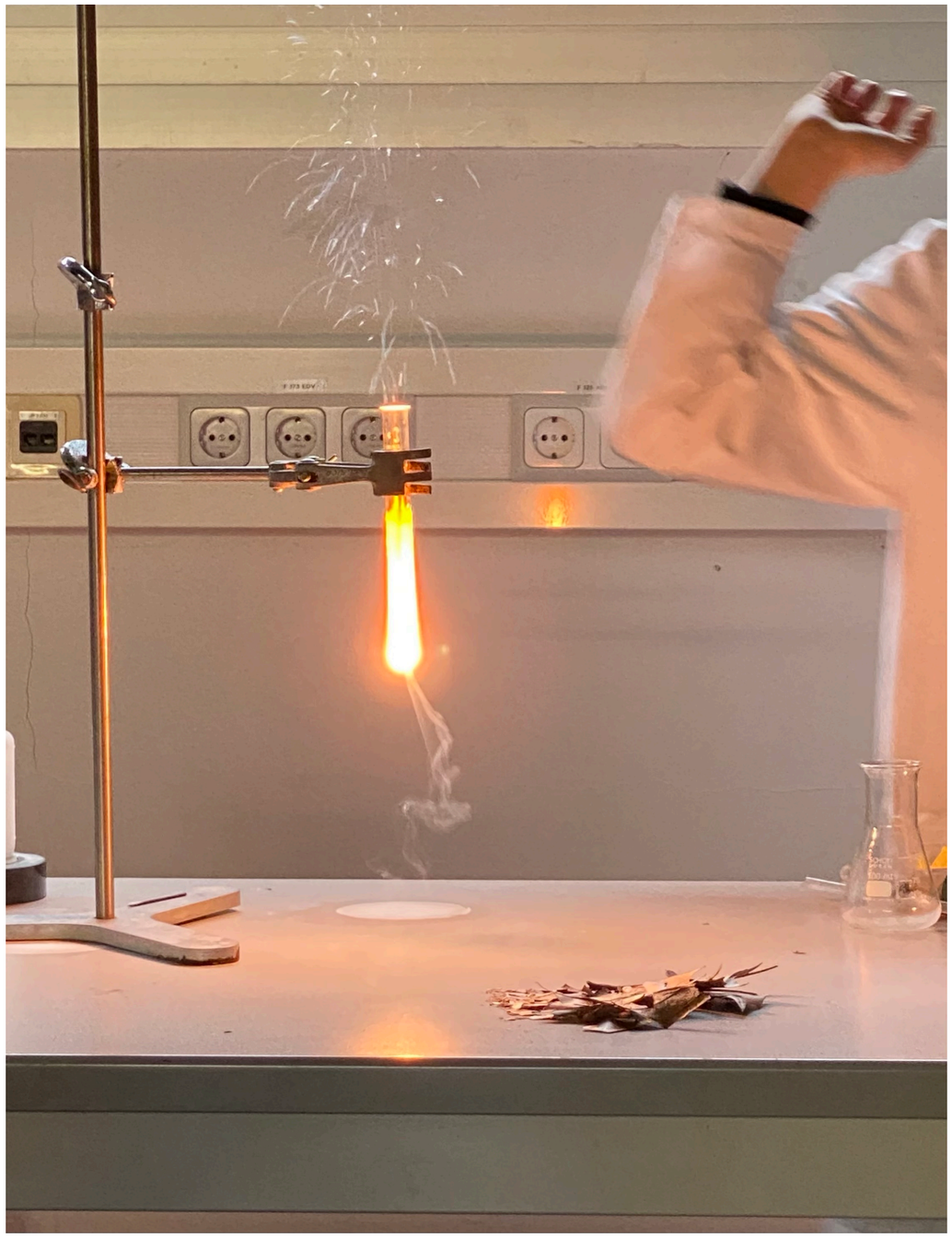
Oleg Kot

Paul Stoicovici

Zoey Miles

Zoey and Danny

Ignited stick



Zoey and Danny

Equipment:

Liquid nitrogen, tube, ignited stick, ring stand with tube clamps.

Execution:

1. The scientist put liquid oxygen in a tube and chilled it with liquid nitrogen

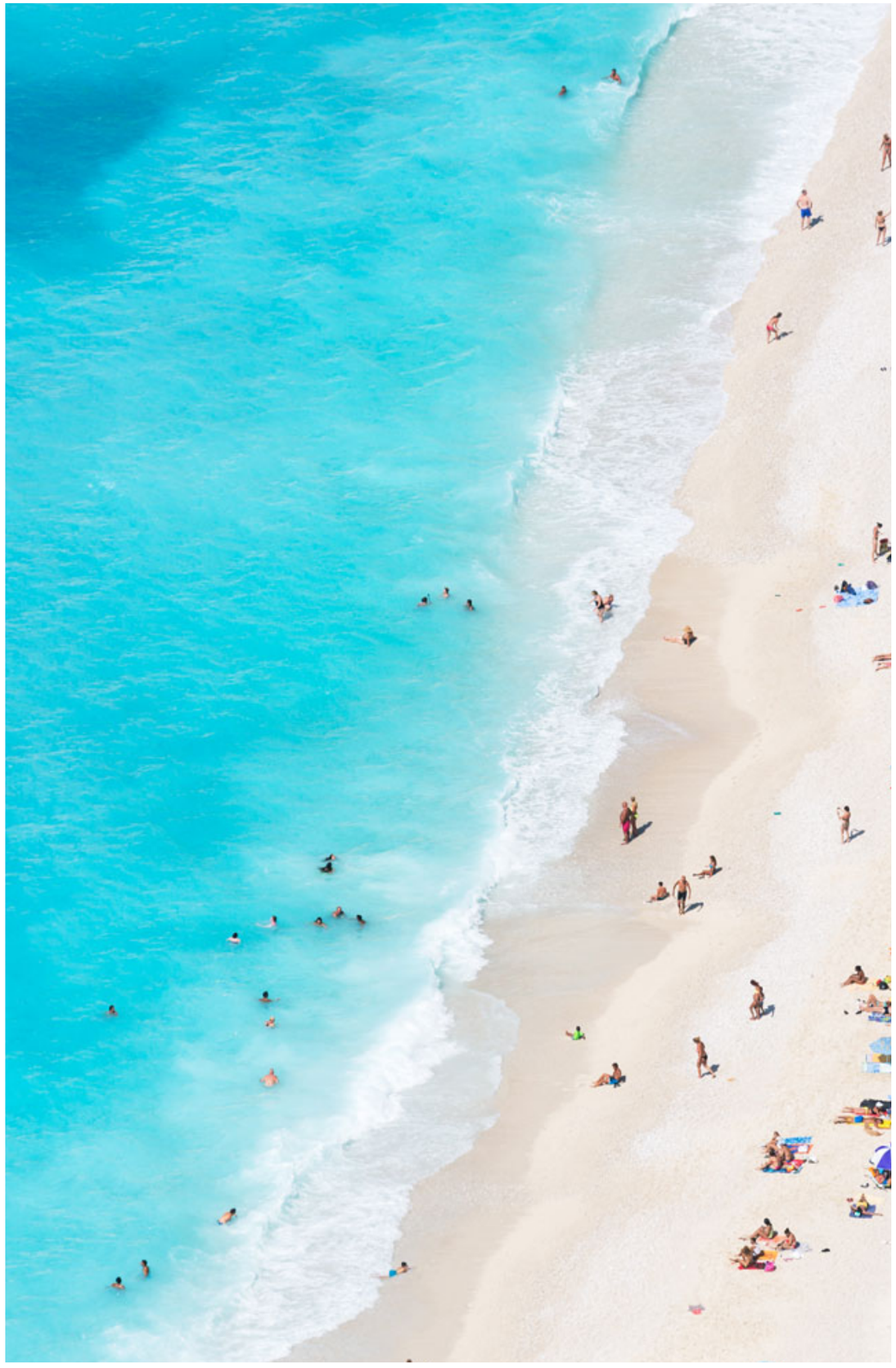
2. Then she took a stick that was on fire and blew it out

3. After that, she put the ignited stick in the liquid oxygen

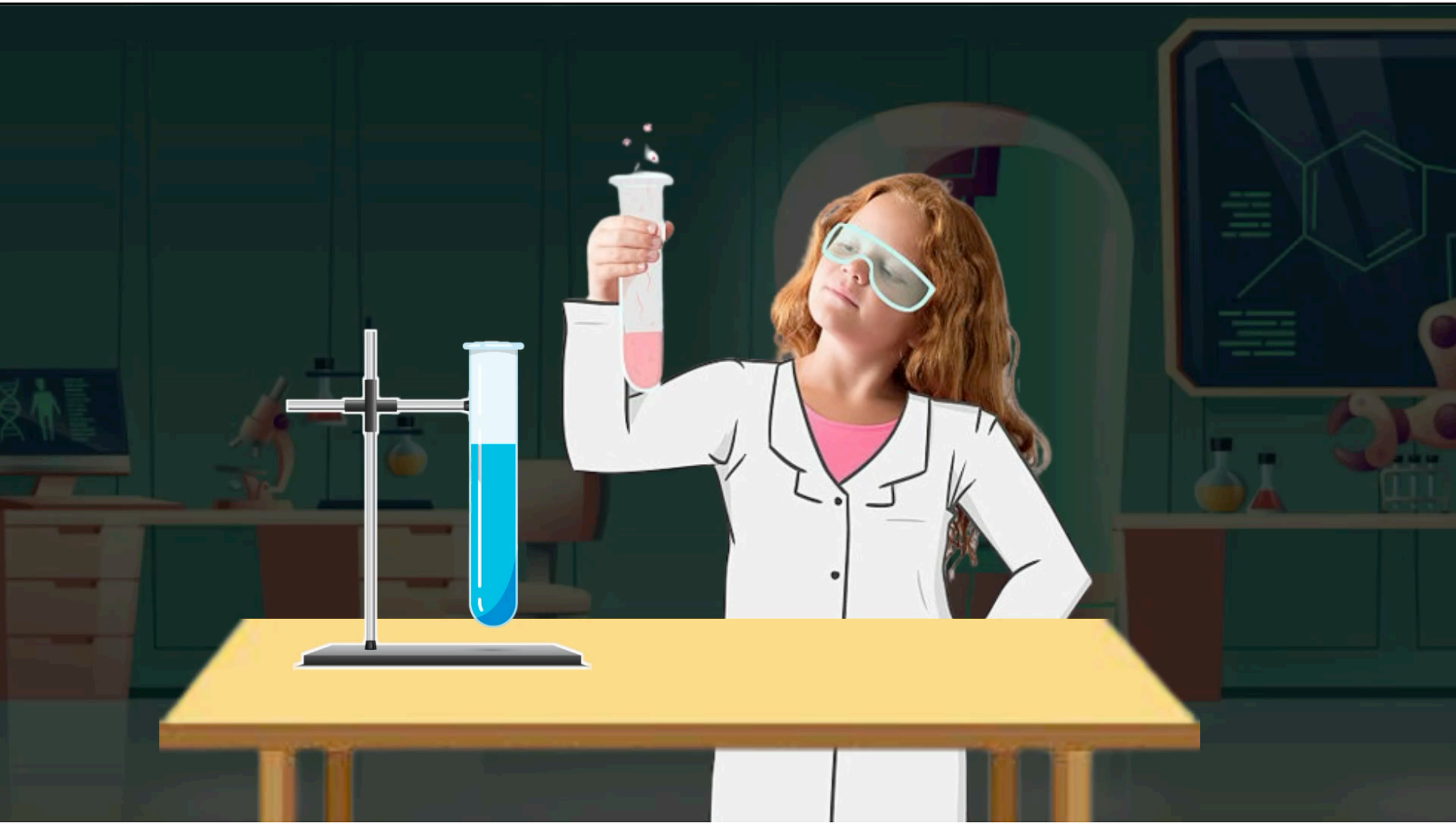
4. Finally, the ignited stick reignited and proceeded to shoot out of the test tube.

Zoey and Danny

Explanation



At room temperature, oxygen is in a gas state. After it was cooled with liquid nitrogen it changes the state of aggregation and it is now liquid because the oxygen condenses.
After that, the stick was put back in the liquid oxygen and it reignited due to the fact that the oxygen allowed the fire to breathe.



Zoey and Danny

What is oxygen used for?

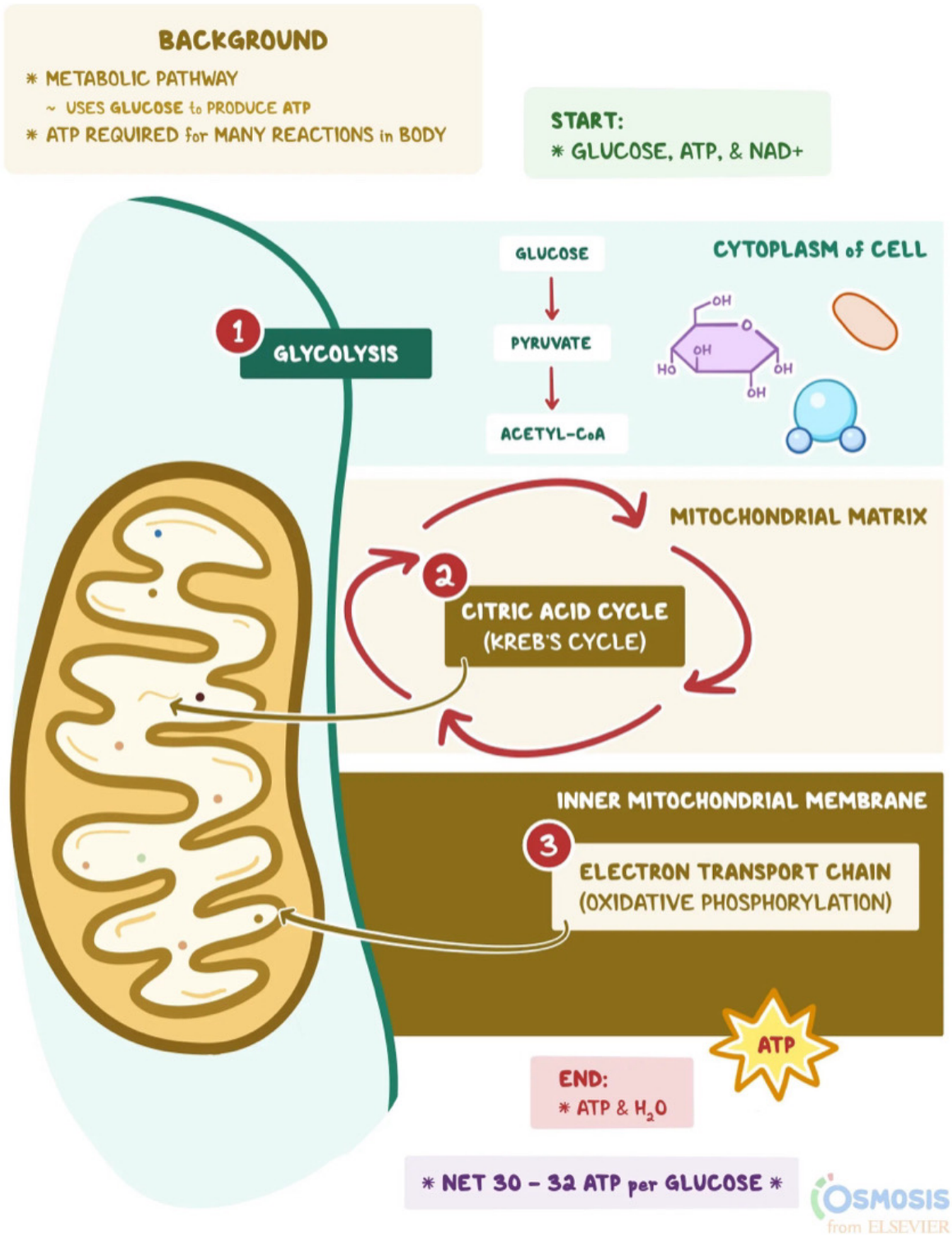
Common uses of oxygen include production of steel, plastics and textiles, brazing, welding and cutting of steels and other metals, rocket propellant, oxygen therapy, and life support systems in aircraft, submarines, spaceflight and diving https://en.wikipedia.org/wiki/Oxygen

Oxygen (O) is responsible for cellular respiration in plants. This element plays a critical role in photosynthesis and is both stored for energy and released as a byproduct https://www.cropnutrition.com/nutrient-knowledge/oxygen

Zoey and Danny

Cellular Respiration

Cellular respiration is a process in which our cells produce energy from food. Oxygen is used in this process and it helps to collect electrons released from the food. These electrons pass through a chain of molecules, which leads to the creation of water.



Elisha and Paul

Titanic

The burning boat

Elisha and Paul

Equipment:

Boat (hollow spiral pipe, candle holder, piece of wood), fuel, metal tub with water

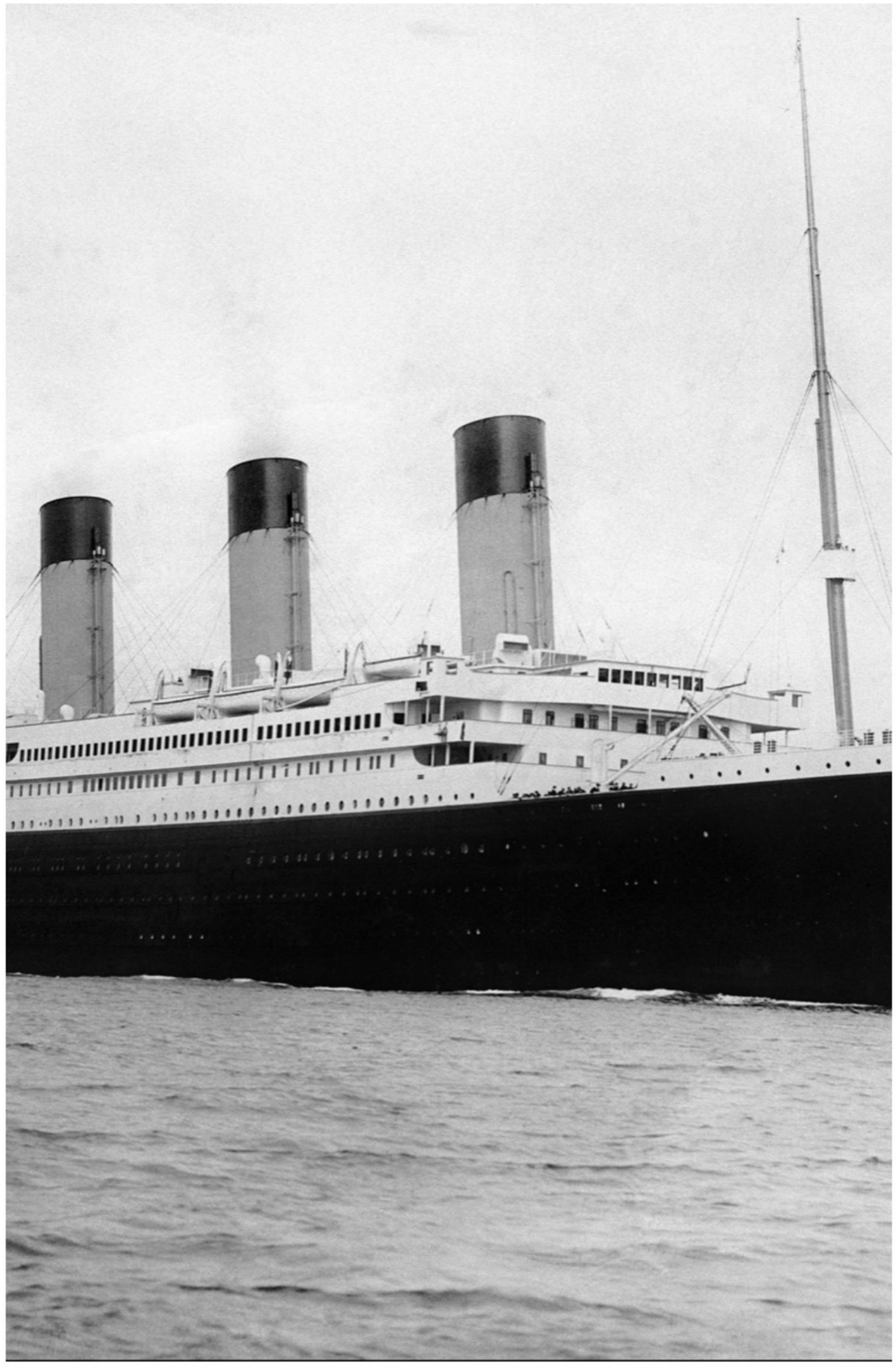
Execution of the experiment:

1. Fill the spiral tube with some water

2. Place the boat in the water

3. Add your needed fuel into the candle holder

4. Get a lighter to put on the fire



Elisha and Paul

Explanation

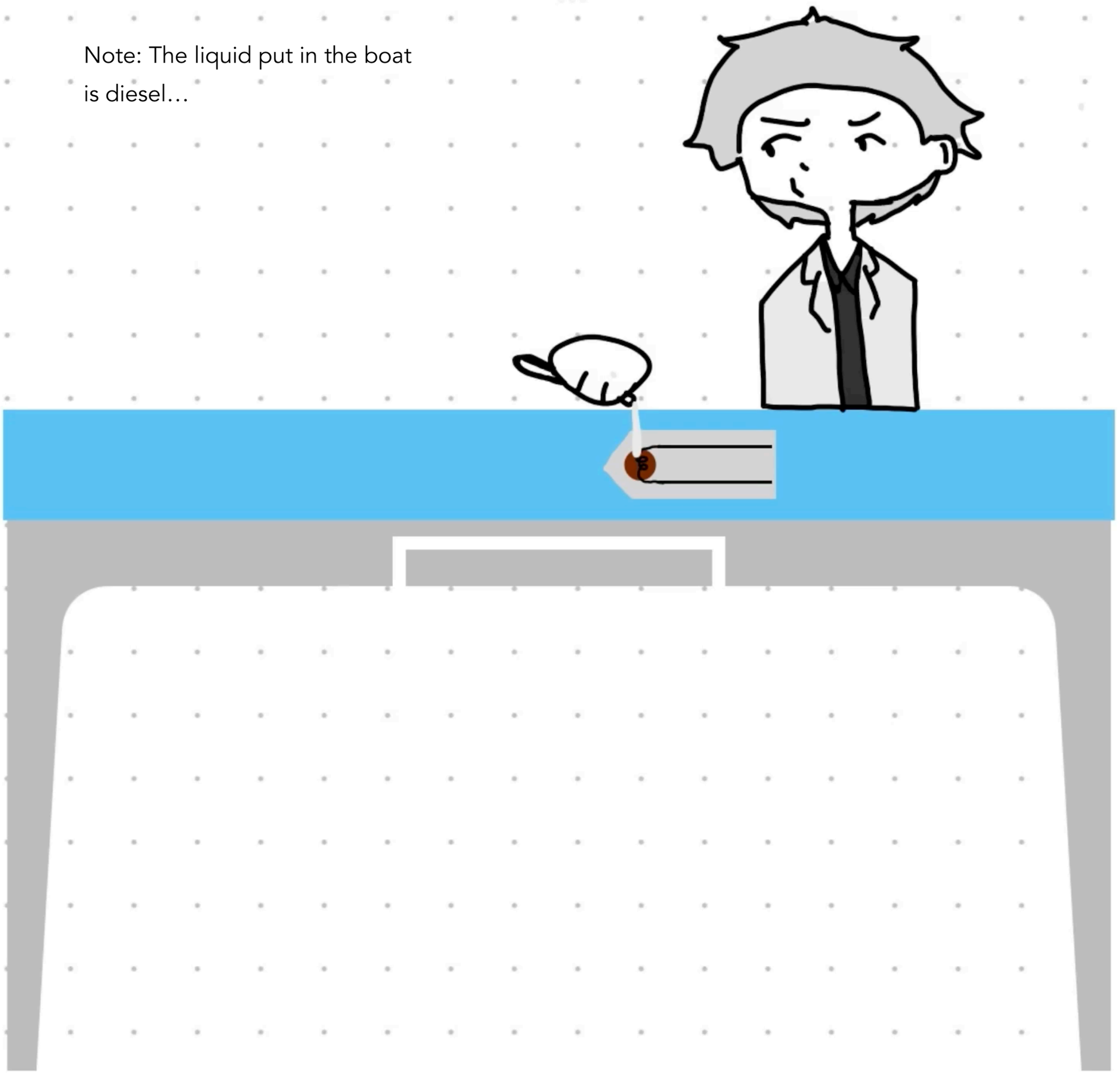
Place the boat in the tub filled with water and here is what happens:

When the fire is lit, the water inside the spiral simmers.

Because of the temperature, the state of aggregation changes to gas form, so called water steam. There’s a higher energy level and the particles have more distance to each other and the steam leaves the open pipe —> makes the boat move

But of course, when the water stops simmering because the fire is slowly going out (fuel is wasted), the boat will eventually stop moving.

Note: The liquid put in the boat is diesel…



Elisha and Paul

Be careful with that iceberg!!

Energy content in foods:

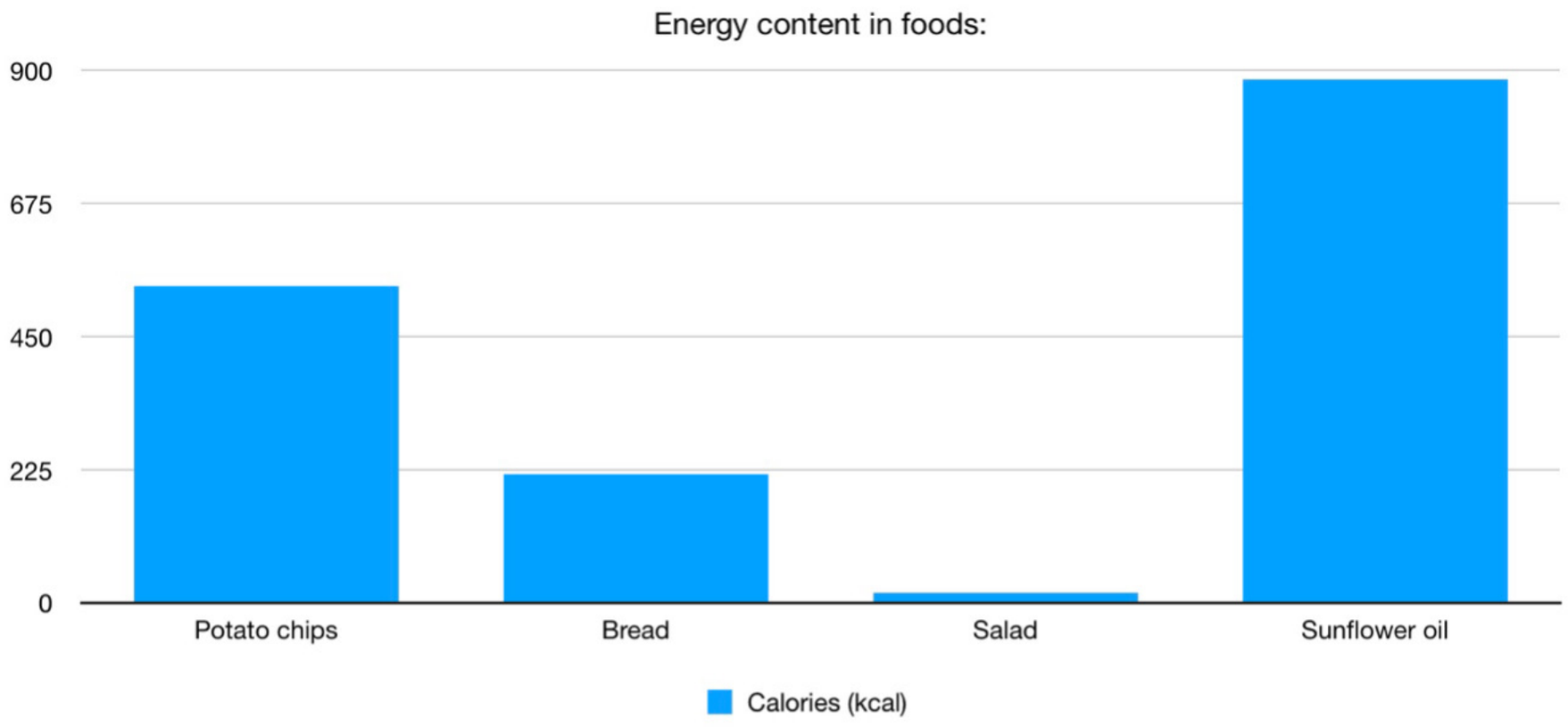


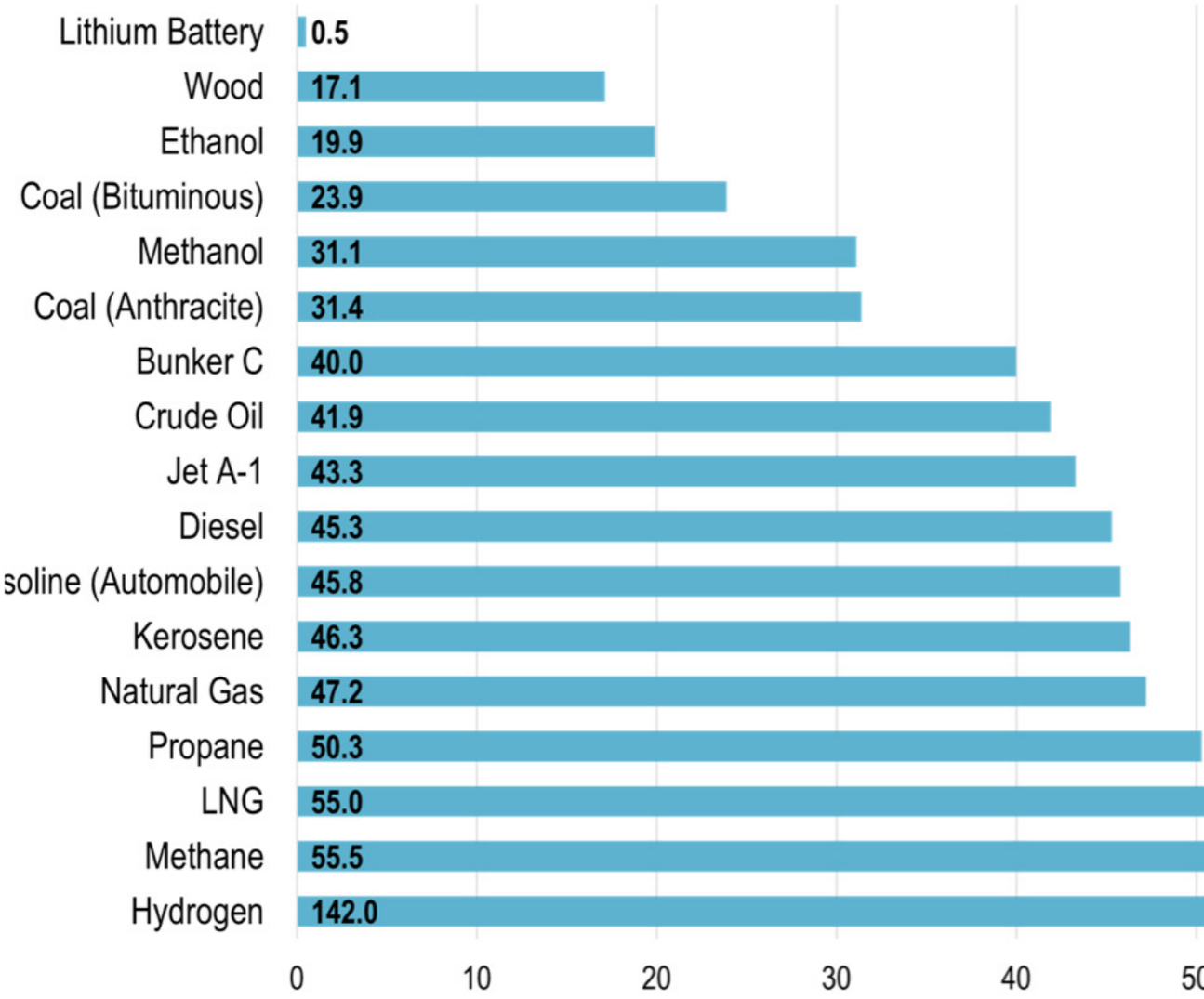
Table 1

	Calories (kcal)
Potato chips	536
Bread	217
Salad	17
Sunflower oil	884

Sunflower oil has much more energy than salad, bread and potato chips.

Salad has way less energy than bread, potato chips and sunflower oil.

Energy Density of some Combustibles (in MJ/kg)



Ethanol has less energy than Diesel and Gasoline.

Gasoline has the most energy than the other 2, as you can see, Hydrogen has the most on this list!

And lithium battery has the lowest amount in this list!

Scientists are also trying to make new car products with Hydrogen soon! Well they better do that quickly before global warming becomes more worse than now!!

https://transportgeography.org/contents/chapter4/transportation-and-energy/

Victoria and Angel

Bases and acids in foods

PH indicators

Victoria and Angel

Equipment:

Water, hydrocloric acid, graduated cylinder, caustic soda, Phenolphthalein, Bromthymolblue.

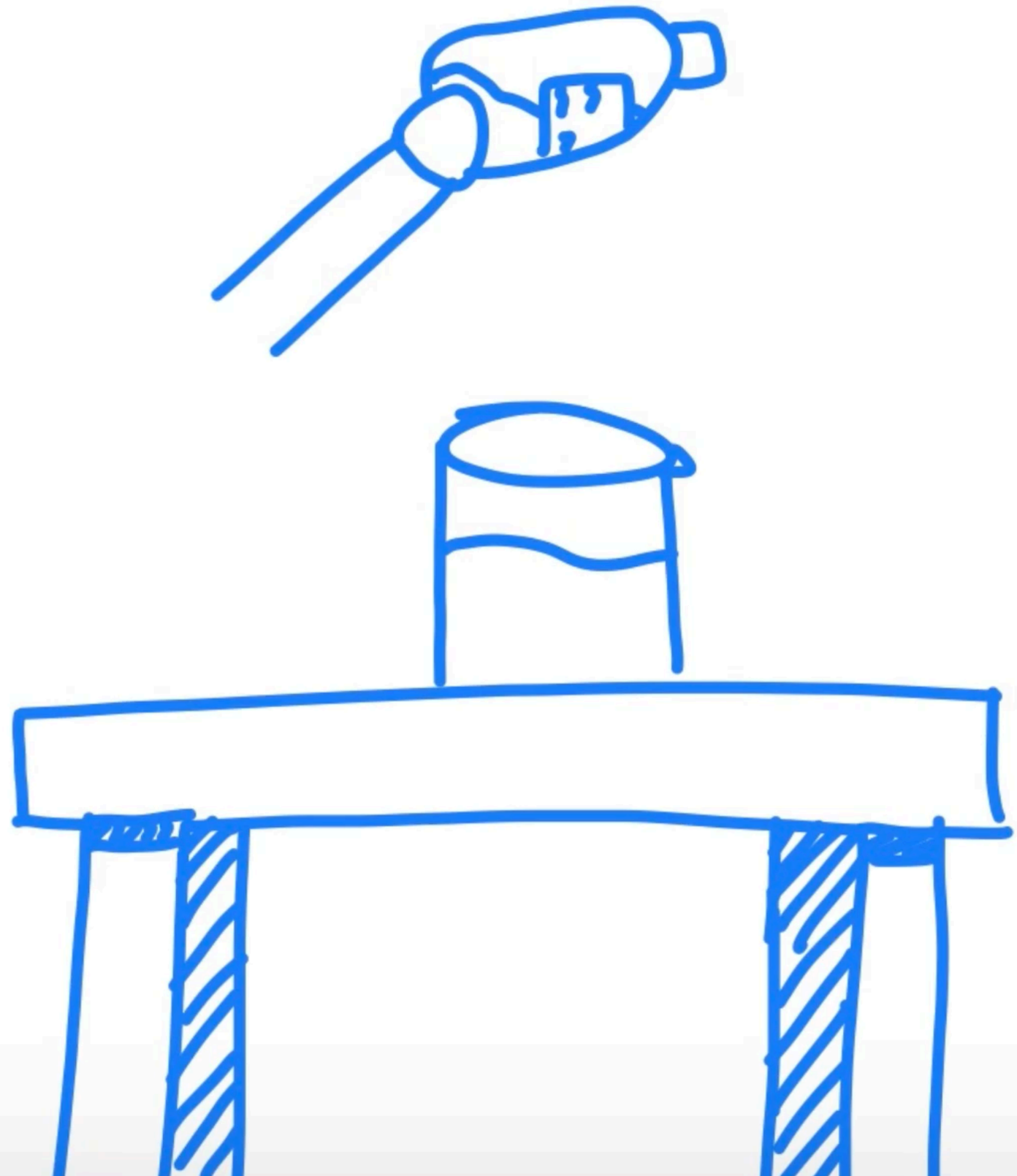
Execution:

fill the beaker/ cylinder with water and then add Phenolphthalein to a beaker and in the cylinder the fill Bromthymotblue

Explanation:

pH indicators detect the presence of H+ and OH-

Ph indicator are weak acids that exist as natural dyes and indicate the concentration of H+ (H3O+) ions in a solution via color change



Victoria and Angel

Acids and Bases

The chemical difference between acids and bases is that a base is a substance that neutralises acids. When bases are added to water, they split to form hydroxide ions, written as OH-. We call a base that has been added to water an alkaline solution.
Acids have a sour taste and turn certain dyes red. Some acids made by the body, such as gastric acid, can help organs work the way they should. An example of an acid is hydrochloric acid.

Victoria and Angel

Acid/Base reactions and pH indicators

Acid base reaction

An acid–base reaction is a chemical reaction that happens between and acid and base.

Several theoretical frameworks provide alternative conceptions of the reaction mechanisms and their application in solving related problems; these are called acid–base theories, for example, Brønsted–Lowry acid–base theory

Ph indicator

pH indicators are specific to the range of pH values one wishes to observe. For example, common indicators such as phenolphthalein, methyl red and bromothymol blue are used to indicate pH ranges of about 8 to 10, 4.5 to 6, and 6 to 7.5 accordingly.

Information from: https://www.google.de/search?

Conan and Oleg

The shrinking balloon

Equipment

- One balloon full of carbon dioxide
- Liquid nitrogen
- Bromothymol blue mixed with water
- Graduated cylinder

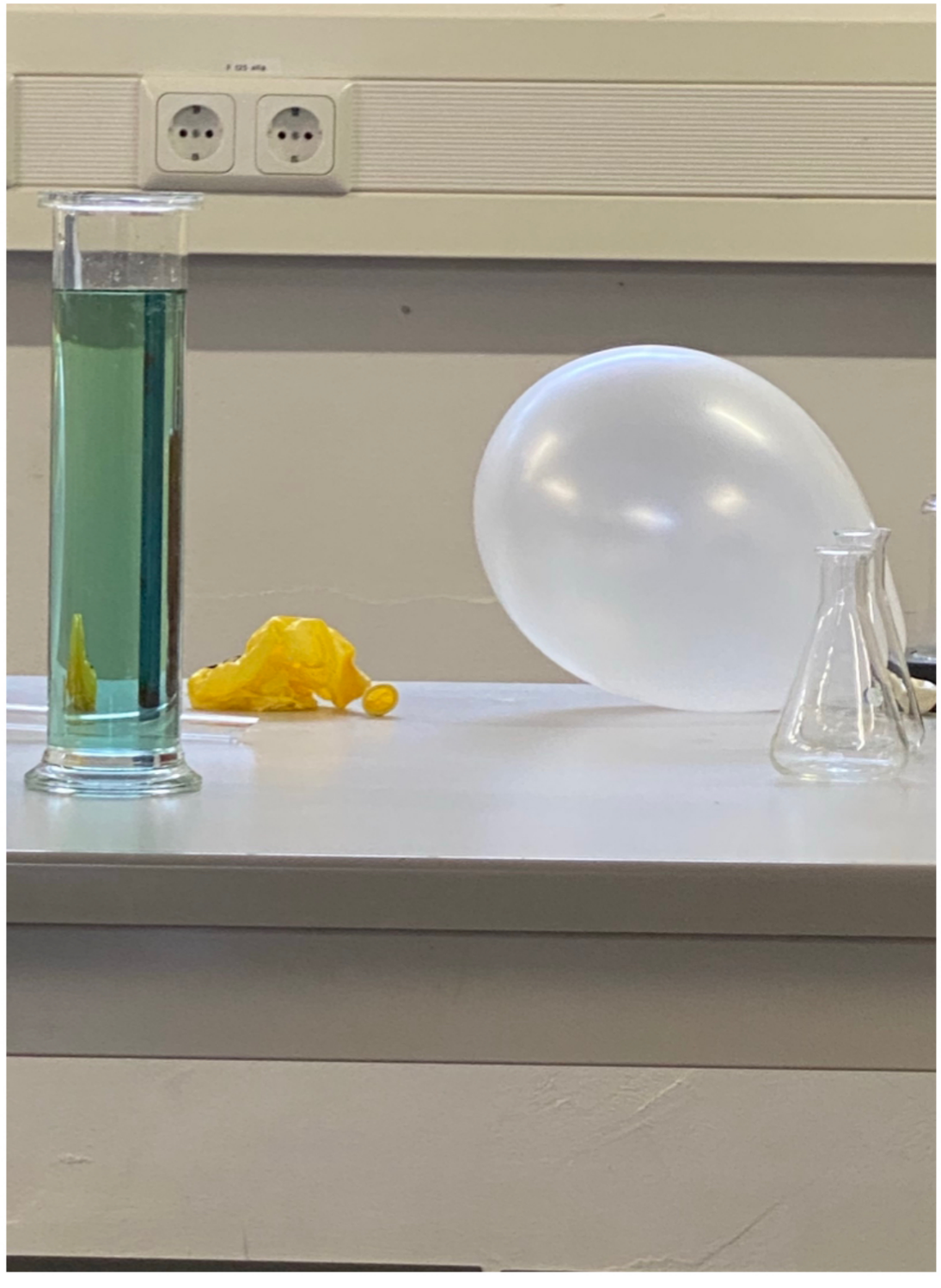
Execution

1. Fill the balloon with carbon dioxide gas

2. Put the balloon in the liquid nitrogen

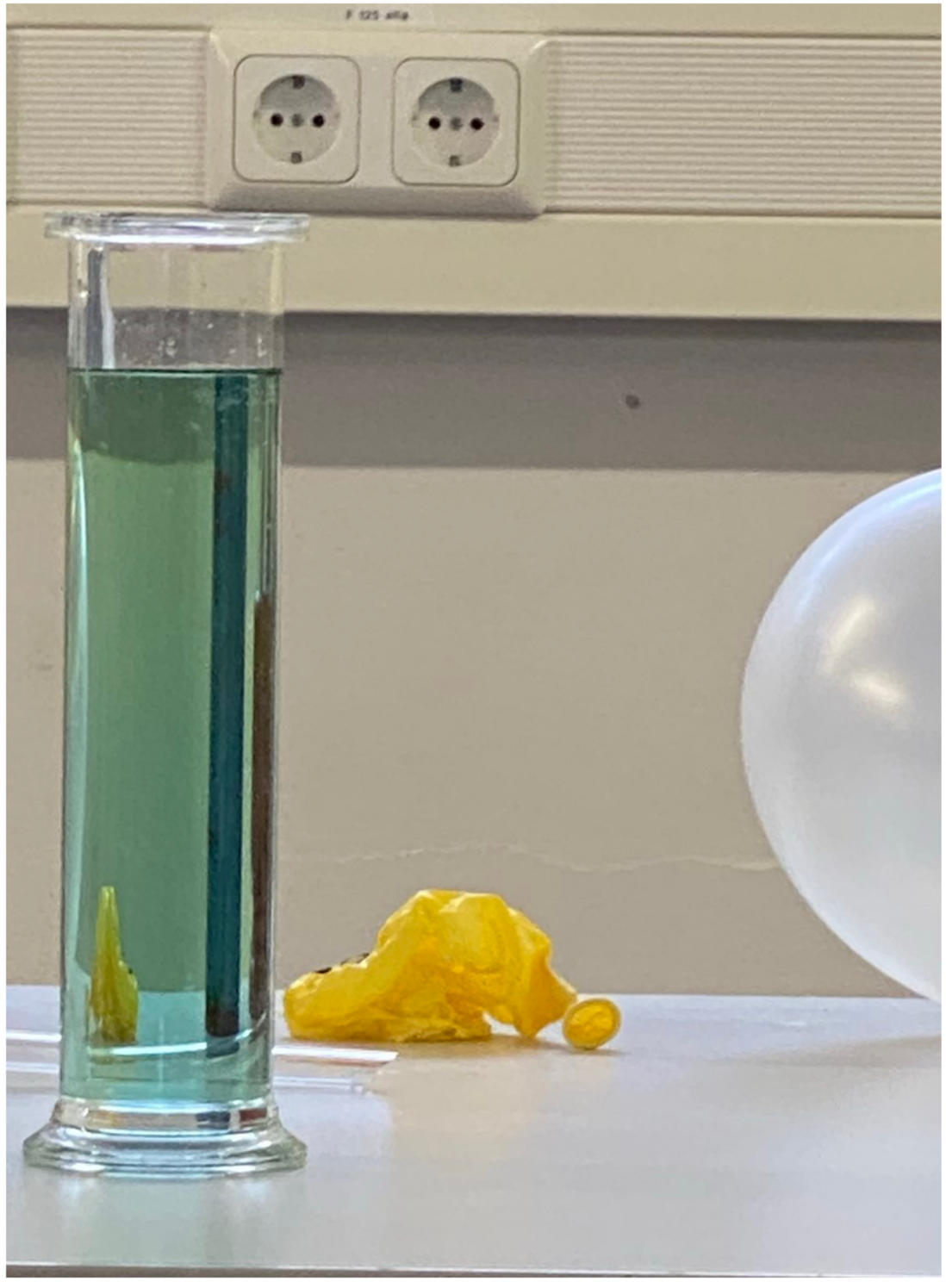
3. After it shrinks, take it out and cut the balloon open

4. In the balloon, you will find cubes of solid carbon dioxide. Take them out and put them in the graduated cylinder (with Bromothylmol blue)



Explanation

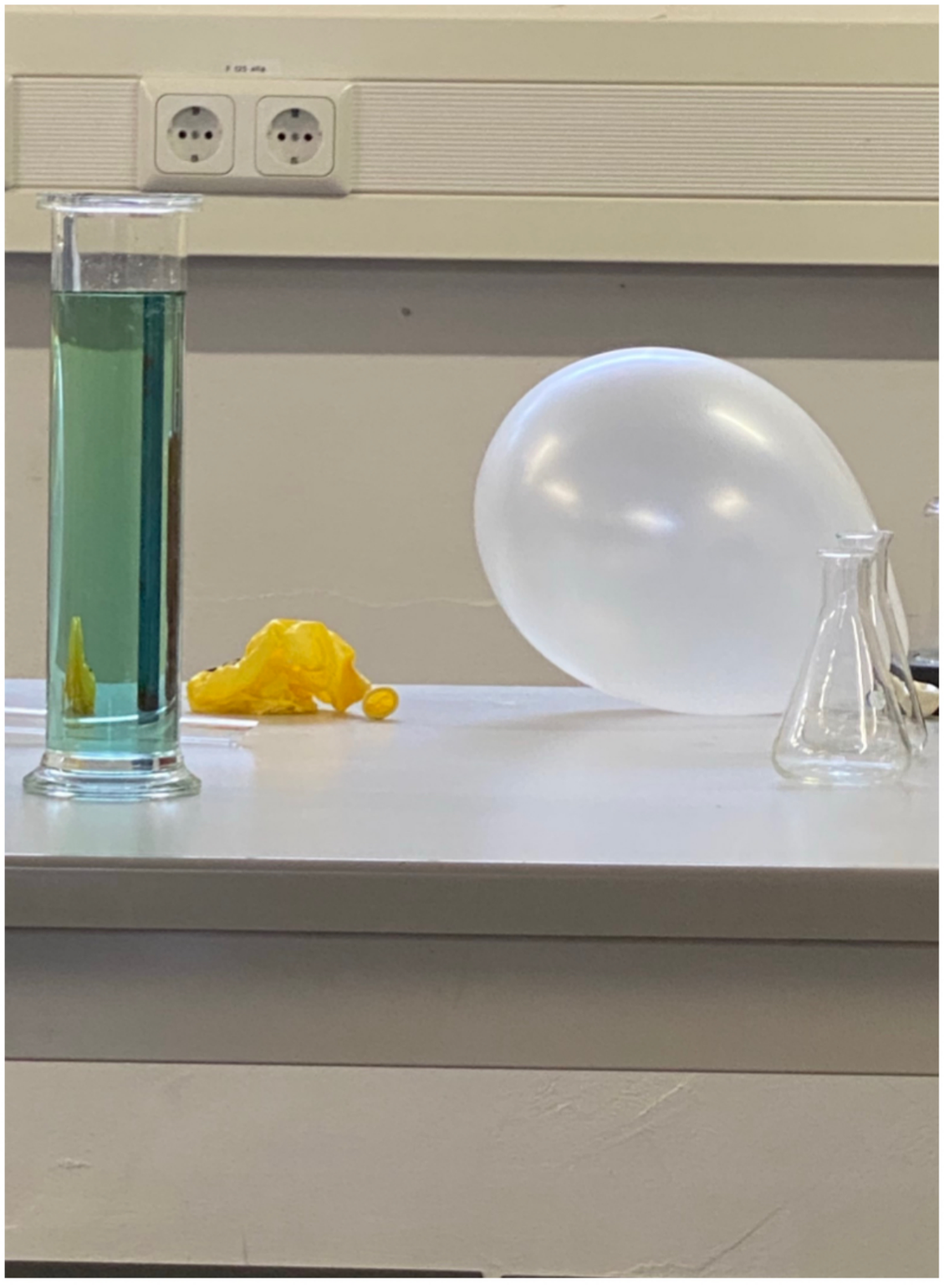
- Carbon dioxide gas turned to a solid state because it froze / solidified due to the liquid nitrogen
- Bromothylmol blue turned yellow because when carbon dioxide is added to water it transforms into carbon acid (yellow indicates an acidic pH level)

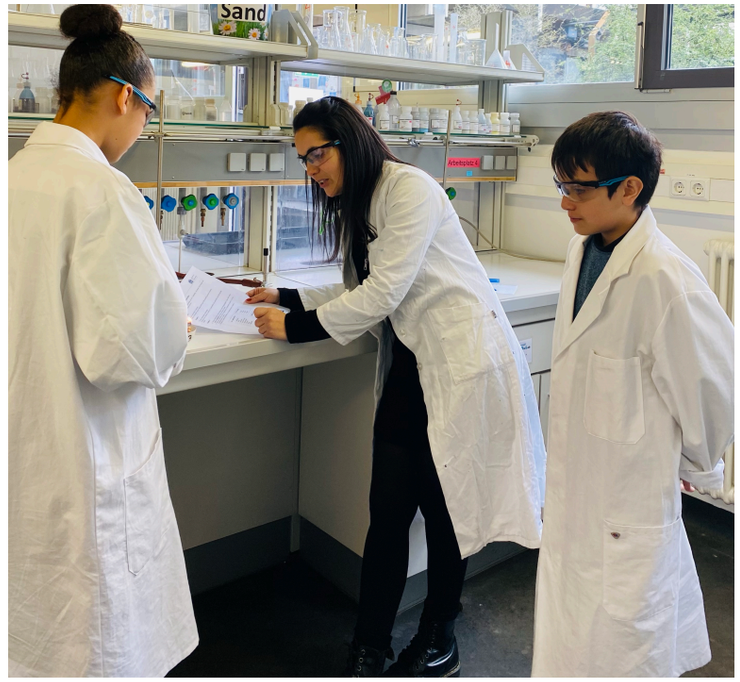


Conan and Oleg

Nitrogen in the food industry

Nitrogen is used by the food industry. By reducing the oxygen level, nitrogen can help to preserve, freeze and package food while making it last longer.




Sand


Sand