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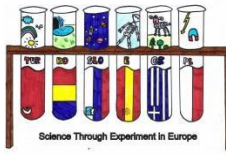
**ERASMUS+ KA2 2016-2018**

# SCIENCE THROUGH EXPERIMENT IN EUROPE



**CEIP BLAS DE OTERO MADRID**





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Science is magic that works.

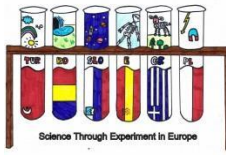
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# WATER EXPERIMENTS

**COUNTRY:** Spain

**SCHOOL:** CEIP Blas de Otero

**EXPERIMENT NUMBER:** 1

**NAME OF EXPERIMENT:** “Archimedes is back”

### **AIMS OF EXPERIMENT**

- To calculate the volume of different objects and know about Archimedes’ principle.

### **MATERIALS**

- A litre measuring jug and water
- Objects: orange, apple, marble, rubber, pencilsharpener, stone
- Felt pens
- A result chart
- 

### **MAKING EXPERIMENT**

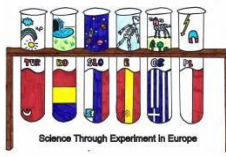
#### **Instructions:**

1. Fill the measuring jug with 300ml of water.
2. Mark with a felt pen the level of the water
3. Put the object inside the water
4. Mark with a felt pen the level of the water again
5. Calculate the volume by taking away the level of water before and after introducing the object

### **RESULT**

- Observe the displacement of water of different objects.
- Archimedes’ principle: “ *Any object when immersed in a liquid will displace a volume of liquid equal to the object’s own volume*”.

**VIDEO** <https://youtu.be/Nsu94mIFfk>



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**PHOTOS**

01 Materials



02 Mark water level



03 Fill the jug



04 Put the objects in

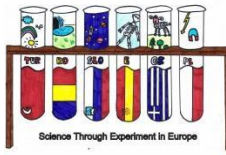


05 Mark the displacement



06 Calculate the volumen





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**CALCULATE THE VOLUME OF THESE OBJECTS**

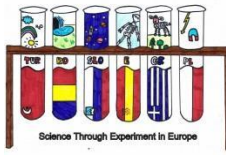
**STEPS**

- 1<sup>ST</sup> Fill the jug with some water
- 2<sup>nd</sup> Mark with a felt pen the level of the water
- 3<sup>rd</sup> Put the object inside the water
- 4<sup>th</sup> Mark with a felt pen the level of the water again
- 5<sup>th</sup> Calculate the volume by taking away the level of water after and before introducing the object

RUBBER	PENCIL SHARPENER	ORANGE	APPLE	MARBLE	STONE

**ANSWER THESE QUESTIONS**

1. What's the volume of the rubber? The volume of the rubber is .....  $cm^3$
2. What's the volume of the pencil sharpener?
3. What's the volume of the orange?
4. What's the volume of the apple?
5. What's the volume of the small ball?
6. What's the volume of the stone?
7. Write the definition of volume



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## **WATER EXPERIMENTS**

**COUNTRY:** Spain

**SCHOOL:** CEIP Blas de Otero

**EXPERIMENT NUMBER:** 2

**NAME OF EXPERIMENT:** “Restless molecule”

### **AIMS OF EXPERIMENT**

- To observe how molecules in water move faster due to the heat effect and make water go up.

### **MATERIALS**

- Empty plastic bottle
- Transparent straw
- Plasticine
- Water
- Scissors
- Bowl
- Food colouring
- Microwave.

### **MAKING EXPERIMENT**

#### **Instructions:**

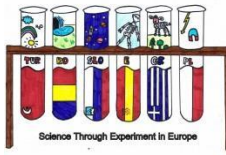
- 1- Make a hole with the scissors on the top of the bottle.
- 2- Put the straw inside the top hole.
- 3- Put plasticine to seal off the hole.
- 4- Fill half of the bottle with water and food colouring.
- 5- Close the bottle with the straw (it has to reach the water)
- 6- Heat water in a bowl and put the bottle inside.

### **RESULT**

- Water goes up the straw when you heat it.







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**VIDEO** <https://youtu.be/Nsu94mlFflk>

**PHOTOS**

01 Add colouring food to hot water.



02 Put a straw inside.



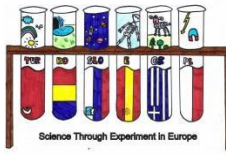
03 Look how water goes up the straw.



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# WATER EXPERIMENTS

**COUNTRY:** Spain

**SCHOOL:** CEIP Blas de Otero

**EXPERIMENT NUMBER:** 3

**NAME OF EXPERIMENT:** “The never-ending cycle”

### **AIMS OF EXPERIMENT**

- To understand the water cycle.

### **MATERIALS**

- Water
- Jug
- Zip bag
- Permanent felt pens
- Microwave
- Boiler.

### **MAKING EXPERIMENT**

#### **Instructions:**

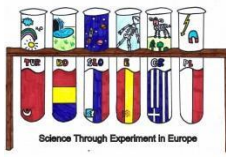
1. Decorate the bottom of the plastic bag as it were the sea with fish, seaweeds, etc.
2. Decorate the top of the plastic bag as it were the sky with the Sun and clouds.
3. Heat the water and pour it into the plastic bag
4. Close it with the zip
5. The water evaporates and water vapour goes up it condenses on the plastic bag and precipitates going back to the bottom of the bag.
6. Label the water cycle by using stickers with the words: evaporation, condensation, precipitation and colección.
7. Draw arrows to show the process.

### **RESULT**

- Observe the water cycle and its different fases.

6





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**VIDEOS** <https://youtu.be/W5Lgr-8Ydmo>

### **PHOTOS**

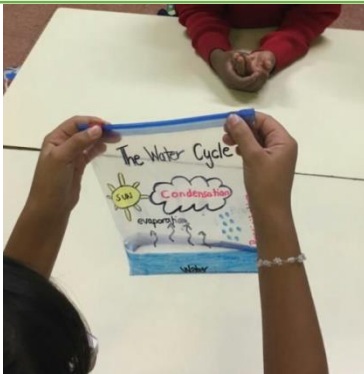
01 Decorate a zip bag



02 Write the words



03 Fill the bag with hot water

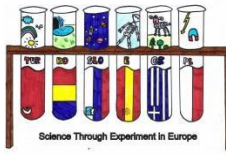


04 Hang it on and window



05 Water evaporates, condenses and precipitates.





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# WATER EXPERIMENTS

**COUNTRY:** Spain

**SCHOOL:** CEIP Blas de Otero

**EXPERIMENT NUMBER:** 4

**NAME OF EXPERIMENT:** “Separate and you'll win!”

### **AIMS OF EXPERIMENT**

- To discover how to make mixtures and how to separate them.
- To distinguish between homogeneous and heterogeneous mixtures.
- To understand what a saturated mixture is.
- To learn how stalactites are formed.

### **MATERIALS**

- Glasses, water, salt, soil, rope, filters, plastic dishes, sugar, oil, funnel.

### **MAKING EXPERIMENT**

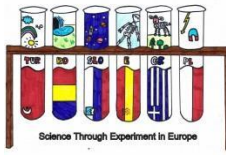
#### **Instructions:**

1. We will make different mixtures: water and sugar, water and salt, water and soil and water and oil.
2. Water with both: sugar and salt form a homogeneous mixture so we cannot distinguish easily the different substances they have, so we will ask the children how they think we can separate them
3. After that, we will separate sugar from water by evaporating the water.
4. On the other hand, we will use the water and salt mixture to explain what a saturated solution is, then, we will join two different glasses of this solution by using a piece of rope, by this way the solution will flow through it and water will drop salt will form stalactites.
5. Water with soil and oil form heterogeneous mixtures so we can see what their different components are.
6. We will use a filter to separate water from soil and we will separate oil from water by using a funnel.

### **RESULT**

-In first place, we will have four mixtures and after that we will have their components separated again.

**VIDEO** <https://youtu.be/W5Lgr-8Ydmo>



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**RESULTS CHART**

MIXTURE	FILTRATION	EVAPORATION
Flour and water		
Sugar and water		
Sand and water		
Rice and water		
Pasta soup and water		
Talcum powder and water		
Salt and water		

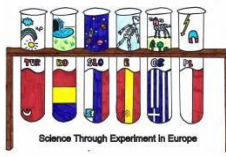
**CONCLUSION**

\_\_\_\_\_

\_\_\_\_\_ can be separated using filtration.

\_\_\_\_\_

\_\_\_\_\_ can be separated using evaporation.



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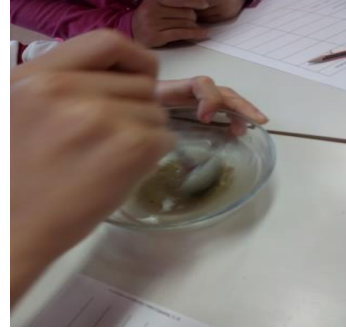
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**PHOTOS**

01 Fill the glass with water



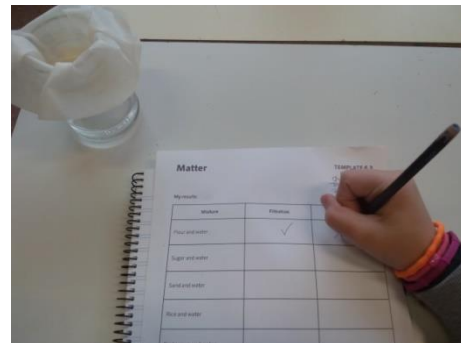
02 Mix water and sand



03 Filter the mixture



04 Register the results

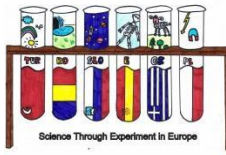


05 Heterogeneous mixtures can be separated by filtration



06 Homogeneous mixtures can be separated by evaporation





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## **MAGNETISM AND ELECTRICITY EXPERIMENTS**

**COUNTRY:** Spain

**SCHOOL:** CEIP Blas de Otero

**EXPERIMENT NUMBER:** 1

**NAME OF EXPERIMENT:** Scalextric

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### **AIMS OF EXPERIMENT**

- To get some knowledge about magnetism.
- To create a homemade circuit and toy cars using magnets

### **MATERIALS**

- Paperclips
- Matchboxes,
- Markers,
- Two sticks of 20cm
- Two magnets
- A thick cardboard
- Adhesive tape

### **MAKING EXPERIMENT**

#### **Instructions:**

1. Decorate the matchboxes to look like racing cars.
2. Stick a paperclip inside of each matchbox with adhesive tape.
3. Draw a circuit in the cardboard.
4. Stick the magnets in the sticks.
5. Raise the circuit from the table and place it on two stacks of books.
6. Move the magnets under the cardboard in order to move the racing cars that are on the circuit.

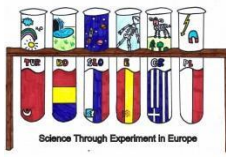
### **RESULT**

- The toy cars move with the force of magnetism through the circuit without touching them.

**VIDEO** <https://youtu.be/n6b7PDlnr3g>

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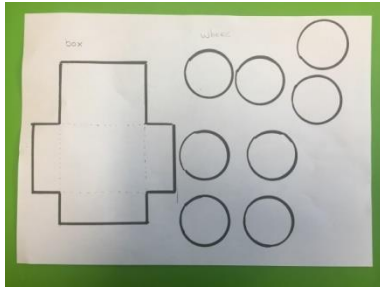


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### PHOTOS

01 Car template



02 Colour and cut the car out



03 Put a clip inside



04 Stick the car to the box



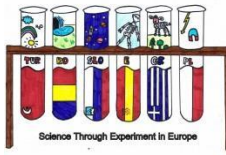
05 Draw and colour the circuit



06 Move the cars using the magnets







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## **MAGNETISM AND ELECTRICITY EXPERIMENTS**

**COUNTRY:** Spain

**SCHOOL:** CEIP BLAS DE OTERO

**EXPERIMENT NUMBER:** 02

**NAME OF THE EXPERIMENT:** Conductor or Insulator?

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### **OBJETIVE OF THE EXPERIMENT**

- To know the concept of electricity
- To learn about conductors of electricity
- To discover if electricity can flow through everything.
- To identify conductors and insulators materials.
- To make a human chain of electricity.

### **Students:**

- To explore science of electricity and circuits by using an *energy stick*
- To be able to explain why the bulb switches on with some objects and with others the bulb stays off.

### **MATERIALS**

- *Energy stick*
- Electric circuit: a battery, 3 electric wires, 6 crocodile clips, small bulb, objects such as rubber, key, coin, scissor, ruler, pencil, etc.
- Register.

### **MAKING THE EXPERIMENT**

#### **Instructions:**

##### **1st part**

1. Use the *energy stick* to explain the science of electricity and circuits. Electricity is defined as the flow of electrons through a circuit (and circuit is based upon the world circle).
2. In order for the *Energy stick* to become activated, the two ends must be connected in a circle by something that allows electrons to flow through it.
3. Invite your friends to join the fun by holding hands and forming a large circle to test their conductivity. The *Energy Stick's* sensing circuit is so sensitive that it can detect even a very small amount of electricity that travels across your skin! It's a cool way to learn about conductors of electricity.

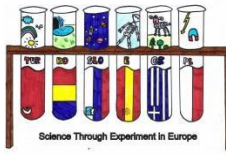
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4. Break the circle and ask to people to hold different objects and see if the *Energy Stick* flash and buzz or stops working.
5. Complete the register with your predictions and results.

### 2nd part

1. Make a traditional circuit like the one on the picture below.
2. Put objects into the circuit. Why the bulb switch on with some objects and with others stays off?
3. Experiment with more objects but predict the results each time and complete the register before and after.

### 3rd part

1. Compare the results with the rest of the teams.

## RESULTS

Conclusion: Which materials let the electricity flow?

Look at your register and write sentences like these:

.... *lets/doesn't let electricity flow.*

..... *is a conductor/ insulator.*

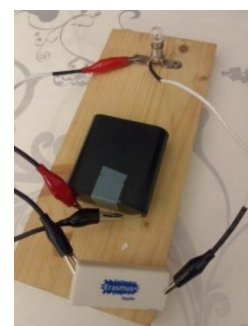
01 Energy stick



02 Metal is a conductor

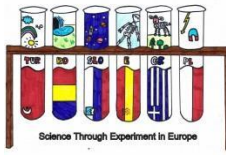


03 Rubber is an insulator



**VIDEO** <https://youtu.be/mGPcIMgz7yo>





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**REGISTER:**

**MY PREDICTIONS BEFORE THE EXPERIMENT**

<b>TICK IF YOU THINK THESE OBJECTS LET FLOW THE ELECTRICITY</b>					
	RUBBER	KEY	PENCIL	RULER	COIN
<b>CONDUCTOR</b>					

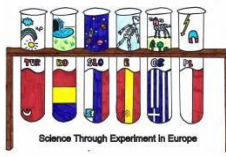
**MY RESULTS AFTER THE EXPERIMENT**

<b>PUT THESE OBJECTS INTO THE CIRCUIT AND TICK IF THE OBJECT LET FLOW OR DOESN'T LET FLOW THE ELECTRICITY</b>					
	RUBBER	KEY	PENCIL	RULER	COIN
<b>CONDUCTOR</b>					
<b>INSULATOR</b>					

**Write sentences about these objects: rubber, key, pencil, ruler, coin.**

*.... lets/doesn't let electricity flow.*

*..... is a conductor/an insulator.*



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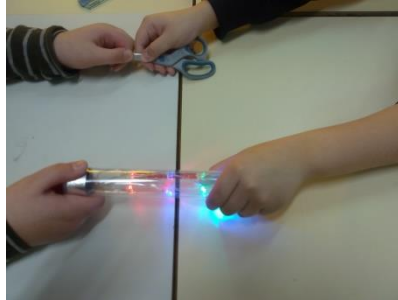
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**PHOTOS**

01 Testing objects with the energy stick.



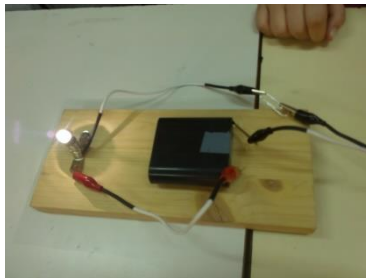
02 Is a pair of scissors a conductor?



03 Is a coin a conductor?



04 Use a home made circuit.



05 Putting objects into the circuit.



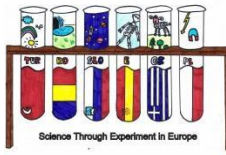
06 Is a piece of wood a conductor?



07 Fill the table with your predictions before doing the experiment and with your results after doing the experiment.

MY PREDICTIONS BEFORE THE EXPERIMENT		MY RESULTS AFTER THE EXPERIMENT	
OBJECT	CONDUCTOR	CONDUCTOR	NON-CONDUCTOR
Scissors	X	✓	
Coin	X	✓	
Wood	X		✓





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## **MAGNETISM AND ELECTRICITY EXPERIMENT**

**COUNTRY:** Spain

**SCHOOL:** CEIP Blas de Otero

**EXPERIMENT NUMBER:** 3

**NAME OF EXPERIMENT:** Flapping butterflies!

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### **AIMS OF EXPERIMENT**

- To discover how static electricity works.

#### **Students:**

- To make a butterfly and make it flaps its wings with static electricity.

### **MATERIALS**

- Balloons
- Cardboard,
- Tissue paper,
- Scissors.

### **MAKING EXPERIMENT**

#### **Instructions:**

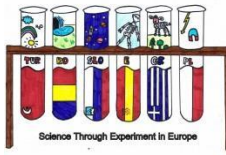
1. We will make a butterfly by cutting the tissue paper.
2. After that we will rub the balloon with the hair so it gets charged.
3. Then we will place the balloon next to the wings of the butterfly so it moves.

### **RESULT**

- We'll have a butterfly which moves its wings.

**VIDEO** <https://youtu.be/vF7i66otJFI>





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**PHOTOS**

01 Draw the butterfly's body.



02 Draw the butterfly's wings.



03 Cut the wings out.



04 Stick the butterfly on a cardboard and colour its body.



05 Blow the balloon and rub the balloon with your hair.



06 Place the balloon close to the butterfly's wings and see how it flaps.







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## **MAGNETISM AND ELECTRICITY EXPERIMENT**

**COUNTRY:** SPAIN

**SCHOOL:** CEIP - BLAS DE OTERO

**EXPERIMENT NUMBER:** 4

**NAME OF EXPERIMENT:** “Electricity and Compasses”

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### **AIMS OF EXPERIMENT**

- To demonstrate the relationship between electricity and magnetism.
- To learn that electricity is a flow of electrons.
- To observe how the magnet in a compass is affected by a flow of electrons which passes through an electric circuit.

### **MATERIALS**

One set per group of students (4 students each)

- A compass
- An electric circuit: battery, 3 cables, a lightbulb and a switch.

### **MAKING EXPERIMENT**

#### **Instructions:**

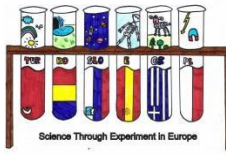
1. Close the circuit and check it on and off. Leave it off.
2. Place the compass on any of the cables.
3. Switch the circuit on and check that the compass needle slightly moves to the right or left.
4. Switch the circuit off and check that the compass needle returns to its original position.

### **RESULT**

This experiment supports our hypothesis of the relationship between electricity and magnetism, since the flow of electrons from a circuit is able to move a compass needle.

**VIDEO** [https://youtu.be/xIw\\_sOIgAZY](https://youtu.be/xIw_sOIgAZY)

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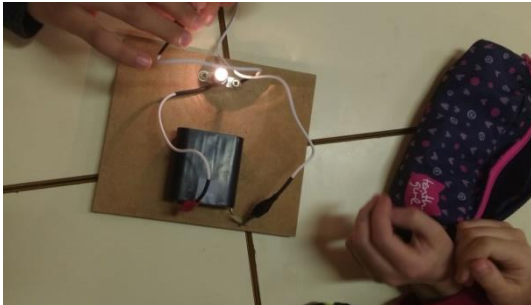


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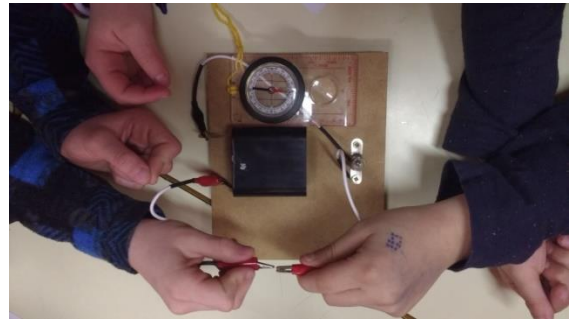
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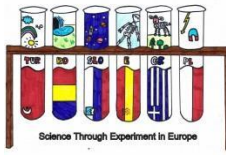
### PHOTOS

01 Check the circuit



02 Place the compass on any wires and look how the needle moves.





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## **HUMAN BODY EXPERIMENTS**

**COUNTRY:** Spain

**SCHOOL:** CEIP Blas de Otero

**EXPERIMENT NUMBER:** 1

**NAME OF EXPERIMENT:** Homemade ear

---

### **AIMS OF EXPERIMENT**

- To be able to create a homemade ear and to understand how the auditive sense works.

### **MATERIALS**

- Cardboard tube.
- Piece of cardboard.
- Piece of plastic.
- Rubber band

### **MAKING EXPERIMENT**

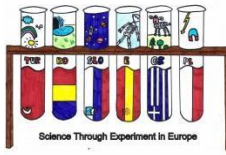
#### **Instructions:**

1. In one of the ends of the cardboard tube put a piece of cardboard as if it was a funnel (ear).
2. In the other end of the cardboard tube put a piece of plastic well stretched and hold it with an elastic band.
3. When we make sounds in the ear the eardrum vibrates (the child can notice it with his or her fingers).

### **RESULT**

-Children can feel with their fingers the vibration of the plastic that it's how we hear the sounds, after that the vibration travels through the auditory nerves to our brain that decode the message.

**VIDEO** <https://youtu.be/G7Phv0pDshE>



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### PHOTOS

01 Cut the cardboard like a funnel



02 Roll the cardboard like a funnel and glue it



03 Join the cardboard and the roll paper with sellotape

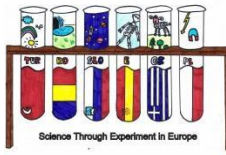


04 In the other end of the cardboard tube put a piece of plastic well stretched



05 When we make sounds in the ear, the eardrum vibrates, the child can notice it with his or her fingers.





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## **HUMAN BODY EXPERIMENTS**

**COUNTRY:** Spain

**SCHOOL:** CEIP Blas de Otero

**EXPERIMENT NUMBER:** 2

**NAME OF EXPERIMENT:** Jointed hand.

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### **AIMS OF EXPERIMENT:**

- To understand how tendon works.
- To comprehend how hands flex.

### **MATERIALS:**

- Scissors
- Bendable straws
- Marker
- Wood
- Sellotape
- Glove (optional)
- 

### **MAKING EXPERIMENT**

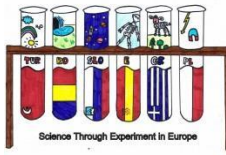
#### **Instructions:**

1. Stick with sellotape the bendable straws on each finger of your partner, so that the bendy part was on the hand and the long part of the straw was on the fingers.
2. Trim the edges of the straw to align with the edge of the fingers.
3. Marked on the straw the joints and knuckles from the real-life hand.
4. Press the straw and fold it on the lines, make a diagonale cut, so that the fingers can curl and bend properly.
5. Make a cut at the top of each straw, pass the string and ran it through each straw, leaving a long tail out both the top and bottom of the straw.
6. At the top of each finger, we tied the string and sellotape the ends together in a small knot.
7. Pull the strings and see how the joints bend and the hand picks light objects.

### **RESULT**

Once the hand was completed, we had lots of opportunity to ‘play’ with it and see how the tendons in a hand function, by pulling downward on the strings.






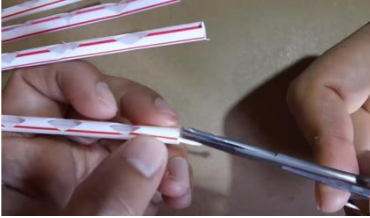




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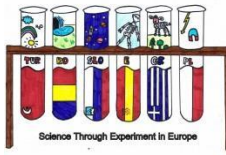
**VIDEO** <https://youtu.be/fUYWwAEYNaa>

### **PHOTOS:**

<p>01 Stick with sellotape the straws and mark the joints of each finger.</p> 	<p>02 Trim the edges of the straw.</p> 
<p>03 Press, fold and cut diagonally the marks</p> 	<p>04 Put scissors through the end of each straw and make a little cut</p> 
<p>05 Pass the string through each straw, make a knot at the top and put sellotape.</p> 	<p>06 Pull the strings and see how the joints bend and the hand picks small objects.</p> 







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## **HUMAN BODY EXPERIMENTS**

**COUNTRY:** Spain

**SCHOOL:** CEIP Blas de Otero

**EXPERIMENT NUMBER:** 3

**NAME OF EXPERIMENT:** “Our digestive system”

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### **AIMS OF EXPERIMENT**

- Investigate how the stomach works.
- Set up and carry out an experiment
- Make predictions
- Record observations
- Compare results
- Reach conclusions

### **MATERIALS**

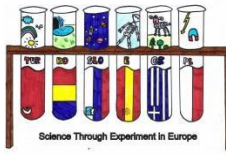
- Biscuits, bananas, water, orange juice, a zip bag, a stocking, a plastic cup with a hole, a bowl

### **MAKING EXPERIMENT**

#### **Instructions:**

1. Before starting discuss functions and parts of the digestive system.
2. Students predict what they think might happen during the experiment.
3. Model how to do the experiment with the help of a pair of pupils. Write all the steps in order on the board.
4. Model how to squeeze the contents of the bag carefully so the bag doesn't split, as well as how to transfer the paste into the stocking. Finally, demonstrate how to get the paste out of the other end of the stocking.
5. Place the students into groups of four to complete the investigation doing the experiment without support.
6. Monitor each group of students and change the task each one does in the group at intervals so that everyone gets a chance to do different parts of the experiment.

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### **Experiment stages:**

1. Put the biscuits and banana into the bag. Add water and orange juice.
2. Squeeze the air out of the bag and close it. Squish the food so it makes a paste.
3. Cut one corner of the bag and pass the paste into the stocking.
4. Pass the paste all the way down the stocking into the cup.

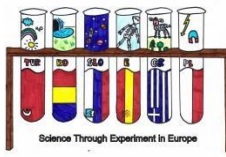
### **RESULT**

#### **RESULTS EXCRETORY SYSTEM EXPERIMENT**

**Write the results by answering to the following questions:**

1. What is the food going to look like at the beginning?
2. What is the food going to look like at the end?
3. What parts of the digestive system do the different stages of the experiment represent?
4. What does the orange juice in stage 3 represent?
5. What does the paste in stage 4 represent?

**VIDEO** <https://youtu.be/3Eipymji2LA>



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### PHOTOS

01 Put the food into the bag



02 Squish the food



03 Food in the stomach is a paste



04 Pass the paste into the stocking



05 Food pass into the small intestine



06 Nutrients pass to our blood



07 Pass the paste all the way down the stocking into a cup

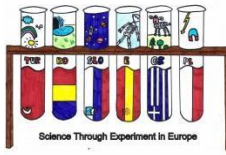


08 Waste products pass to the large intestine



09 Waste products are spelled through the anus





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## **HUMAN BODY EXPERIMENTS**

**COUNTRY:** Spain

**SCHOOL:** CEIP Blas de Otero

**EXPERIMENT NUMBER:** 4

**NAME OF EXPERIMENT:** Excretory system

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### **AIMS OF EXPERIMENT**

- Investigate how kidneys work.
- Set up and carry out an experiment
- Make predictions
- Record observations
- Compare results
- Reach conclusions

### **MATERIALS**

- Funnel
- 4 straws
- 3 balloons
- 2 sponges
- Bowl

### **MAKING EXPERIMENT**

#### **Instructions:**

1. Before starting discuss functions and parts of the excretory system.
2. Students predict what they think might happen during the experiment.
3. Model how to do the experiment with the help of a pair of pupils. Write all the steps in order on the board.
4. Model how to mix the water and food colouring. Finally, demonstrate how the liquid goes through straws (ureters) and the sponges (kidneys). The kidneys remove excess of water and waste products from the blood and turns them into urine. Then the balloon that resemble the bladder collects the urine. When it is full it sends the messages to our brain. It's time to go to the toilet.
6. Place the students into groups of four to complete the investigation doing the experiment without support.
7. Monitor each group of students and check that every child has the chance to do the experiment. 28



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### **Experiment stages:**

1. Put the water and food colouring y a jug.
2. Pour the mixture in the funnel.
3. Look carefully how the mixture goes through the straws to the sponges.
4. Pass the sponges all the way down the balloon into the bowl.

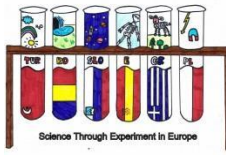
### **RESULT**

#### **RESULTS OF THE ESCRETORY SYSTEM EXPERIMENT**

**Write the results by answering to the following questions:**

1. What is the liquid at the beginning?
2. What is the liquid at the end?
3. What parts of the excretory system do the different stages of the experiment represent?
4. What do the straws and sponges in stage 3 represent?
5. What does the balloon in stage 4 represent?

**VIDEO** <https://youtu.be/FPSW87JT1Nk>

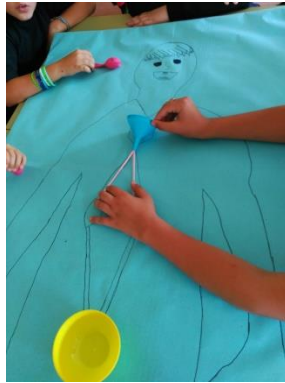


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### PHOTOS

01 The straws are our blood vessels.



02 They are connected to our kidneys. We made them by filling two balloons with sponges.



03 These straws are the ureters that connect our kidneys with our bladder that is a balloon.



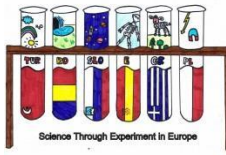
04 Here we're giving our model the finishing touch.



05 You can see how our excretory system works.







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