



GEAR (Global and Environmental Awareness and Responsibility) – a Toolkit for Inclusive Environmental Education

Project Element: Wind and Kite-flying Day 08.11.2019

Tool: Making a Kite

- **Objectives**

- To involve the school community in our Erasmus + KA201 project
- To encourage problem-solving skills, as well as patience and persistence in building a kite.
- To develop a sense of pride and accomplishment in creating their kite.
- To enjoy and have fun trying to fly the kite, even if it only flies when pupils are running with it. Running with their kite is a great way to develop balance and coordination.
- To apply their scientific and artistic knowledges in order to create the kite.

- **Basic transversal competences:**

Basic competence- 8: Competence for thinking, learning and communicating. Gathering and managing information . Understanding information and expressing what has been understood.

Basic transversal competence -9: Competence for initiative, entrepreneurship and communication. Taking initiative and managing initiative processes decisively and effectively.

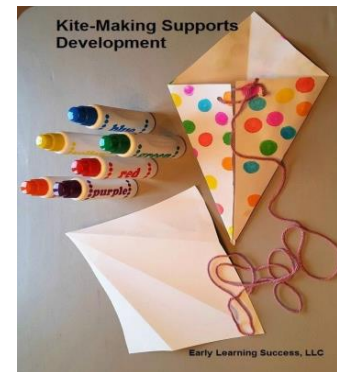
Basic transversal competence -10: Competence for learning and living and communicating together. Taking part in interpersonal, group and community situations in a collaborative manner, recognising one's own and others' rights and duties, for the individual's and everybody's good.

Basic transversal competence -11: Competence to be yourself and communicate: self-regulation. Reflecting on personal activities, behaviour, thoughts and feelings in order to be autonomous and having an appropriate self-concept and self-esteem, and reinforcing or adapting them depending on their assessment.

BELGIUM, FINLAND,GREECE,ITALY,SPAIN AND TURKEY

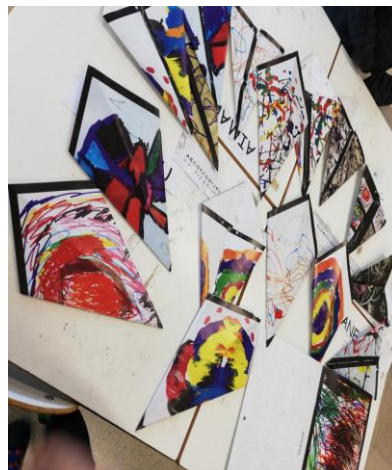
- **Previous steps:**
 - During the dissemination meeting carried out after coming back from the kick off meeting in Greece, the Erasmus+ committee proposed to build kites to the whole teacher staff and all of them agreed.
 - The Erasmus+ committee designed a proposal and spread it out among the teachers.
 - Different options were given as different ages were involved.
- **Getting ready:** Setting the stage for an engaging activity.
 - Tell pupils about the GEAR project. Show them the posters, the countries involved in the project (in Google Earth) and have a look at the school's webpages.
 - Look at pictures of kites around the world and find its different names in each country: "barrilete" in Argentina and Uruguay, "papelote" in Honduras, "Pizcucha" in El Salvador, "Katanga" in India, "komeetta" in Finland, "لعبة طائرة ورقية" in Arabia, "Uçurtma" in Turkey, "vlieger" in Belgium.

([https://es.wikipedia.org/wiki/Cometa_\(juguete\)](https://es.wikipedia.org/wiki/Cometa_(juguete))) and Google translator)
- **Building the kite. Sources:** (Older children may want to investigate building kites on the internet)
 - <https://buggyandbuddy.com/make-kite/>
 - https://www.sciencebuddies.org/science-fair-projects/project-ideas/Aero_p016/aerodynamics-hydrodynamics/fly-a-kite?from=Pinterest#procedure
 - <https://babbledabledo.com/how-to-make-a-kite/>
 - <https://www.wikihow.com/Make-a-Fast-Kite-with-One-Sheet-of-Paper>
 - <https://www.wikihow.com/Make-an-Easy-Kite>



BELGIUM, FINLAND, GREECE, ITALY, SPAIN AND TURKEY

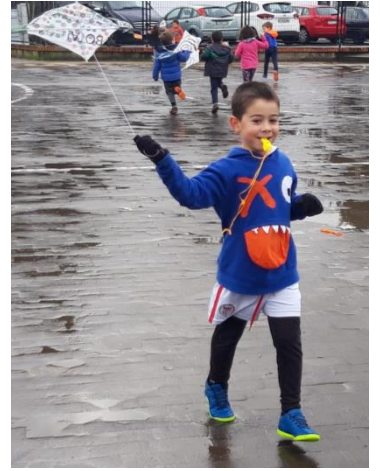
- **Materials:** older pupils decided to reuse and recycle materials we already had at school: newspapers, woollen thread, plastic bags, 2019 left over calendars, sticks they collected outside, wicker we use to make baskets, cello tape.
 - Infants used tissue paper or reused plastic bags, straws and stickers (to decorate)



BELGIUM, FINLAND, GREECE, ITALY, SPAIN AND TURKEY



BELGIUM, FINLAND, GREECE, ITALY, SPAIN AND TURKEY



BELGIUM, FINLAND,GREECE,ITALY,SPAIN AND TURKEY



GEAR (Global and Environmental Awareness and Responsibility) – a Toolkit for Inclusive Environmental Education

Project Element: Wind

Tool: BLOW PAINTING

Age: 5 and 6 years old.

- **Ojectives:**

- To recognise that wind is moving air.
- To explore different painting techniques and understand that art can be created with unconventional materials other than our hands.
- To investigate air pressure by blowing the air in order to make the paint move or change direction
- To observe what happens when we mix colours.

- **Basic transversal competences:**

B.C. 08 Competence for thinking, learning and communicating: Asking questions, making hypothesis, experimenting, observing, creating, selecting, and sharing ideas making use of verbal and non-verbal codes.

B.C. 10 Competence for learning and living and communicating together: taking part in interpersonal and group situations in a collaborative manner, recognising one´s own and other´s rights and duties, for the individual´s and everybody´s good.

B.C. 11 Competence to be yourself and communicate: Self regulation of body function: breath control. Rythm, intensity and direction.

B.C. 09 Competence for initiative, entrepreneurship and communication: Taking initiative and managing initiative processes decisively and effectively: creating a unique artwork.

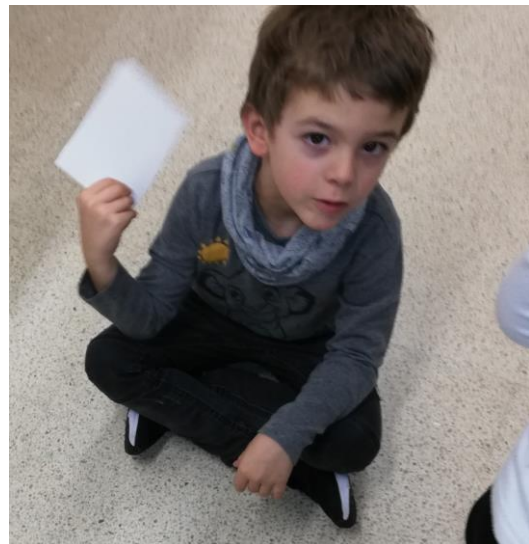
QUESTION: CAN YOU CREATE WIND WITH YOUR BODY?

Start a conversation with the pupils. Start asking:

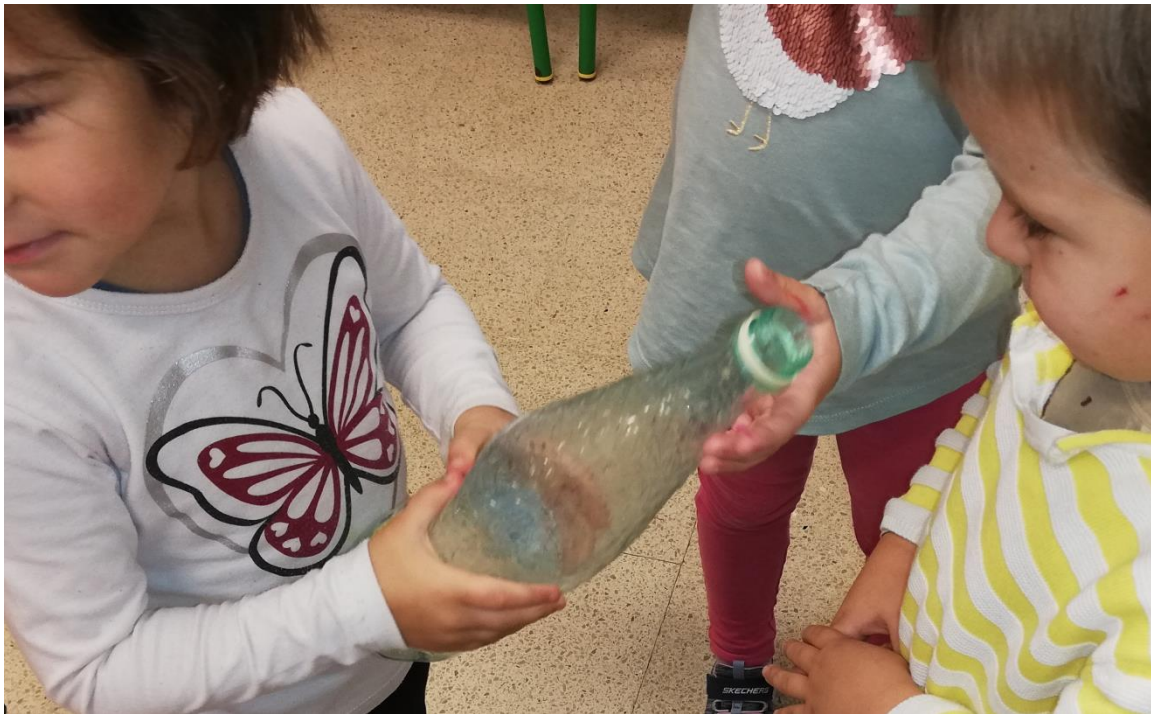
BELGIUM, FINLAND,GREECE,ITALY,SPAIN AND TURKEY

- What is air?
 - Fill a plastic bag with air: what's into the plastic bag?
Take the air out of the bag feeling it flow. What's that?
 - Show pupils two bottles and ask: What's into the bottle?
Squeeze the bottle in front of your face. What did you feel? What's that?
It's a mixture of gasses. Layers of air cover and protect the Earth from the sun rays. It's called "atmosphere".
- Where is the air? Everywhere.
- Can we see the air? No, air is invisible.
- Can we feel the air? We feel air when it is moving. That's WIND. We also see things moved by the wind (for example: leaves.....)
- Can we make the air move with our bodies?
 - Wave your hand in front of your face. What do you feel?
 - Make a windmill move by blowing.
 - Get a piece of cardboard and fan yourself. What do you feel?

THAT'S WIND



BELGIUM, FINLAND,GREECE,ITALY,SPAIN AND TURKEY



QUESTION: CAN YOU CREATE A PAINTING USING WIND?

- Show pupils the materials: straws, tempera paint thinned with water, paper, spoons (to drip the paint)
- Ask pupils if they think they could create a painting using wind, not their hands.
 - Let pupils try their ideas.
- Before start painting, practice blowing through a straw and let pupils feel the wind that will move their paint.
- Drip a drop of paint on the paper and blow the paint in any direction. Blow on the drop making your own design. Let children enjoy the experience the first time. Then we can repeat the activity and find opportunities for observing and discussing different aspects:
 - What happens if you blow the paint hard? (wind speed)
 - What happens when you blow the paint softly? (wind speed)
 - What happens to the paint when you blow in short exhalations? /in one long exhalation?
 - Try cutting the straw in different lengths and blow. What happens?
 - What do you think it will happen if you roll the yellow” colour over the “blue” colour? They will mix and produce “.....” colour.

BELGIUM, FINLAND,GREECE,ITALY,SPAIN AND TURKEY



BELGIUM, FINLAND, GREECE, ITALY, SPAIN AND TURKEY



- **Sources:**

- Pinterest
- <https://sites.google.com/berritzegunenagusia.eus/zientzia-hezkuntza-ikaskelan/haur-hezkuntza>
 - Berritzegune Nagusia. Carlos García Llorente.

BELGIUM, FINLAND,GREECE,ITALY,SPAIN AND TURKEY

GEAR (Global and Environmental Awareness and Responsibility) – a Toolkit for Inclusive Environmental Education

Project Element: Wind

Tool: BLOWING BOATS

Age: 5 and 6 years old.

- **Trigger questions:**
 - ★ Can wind move things?
 - ★ What sort of things can it move?
 - ★ How can you move air?

- **Objectives:**
 - To recognise that we can move the air by blowing through straws.
 - To explore how wind can move the numbered boats (from one to ten).
 - To investigate air pressure by blowing the air in order to put the boats ordered properly.

- **Basic transversal competences:**

B.C. 08 Competence for thinking, learning and communicating: Asking questions, making hypothesis, experimenting, observing, creating, selecting, and sharing ideas making use of verbal and non-verbal codes.

B.C. 09 Competence for initiative, entrepreneurship and communication: Taking initiative and managing initiative processes decisively and effectively: creating the blowing boats.

B.C. 10 Competence for learning and living and communicating together: taking part in interpersonal and group situations in a collaborative manner, recognising one´s own and other´s rights and duties, for the individual´s and everybody´s good.

BELGIUM, FINLAND,GREECE,ITALY,SPAIN AND TURKEY

B.C. 11 Competence to be yourself and communicate: Self regulation of body function: breath control. Rythm, intensity and direction.

- **Math skills:** recognize numerals up to 10 and order them properly.

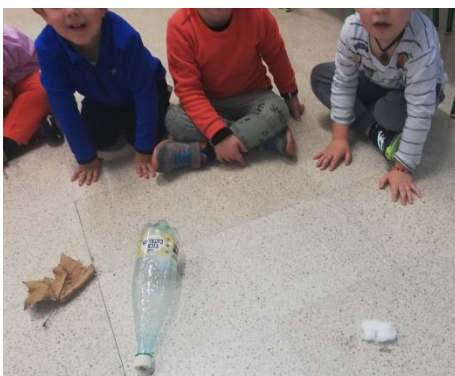
QUESTION: CAN YOU MOVE WIND WITH ANY MATERIAL?

Let's start asking pupils:

- What is air for you?
 - Put some confetti on the table and let's try to move them blowing. What does it happen? That's WIND. We also see things moved by the wind; the trees, leaves,...

Let's investigate moving air:

- Show the children the various materials and ask them: "What are the different ways of using air to move these things? (a bottle of water, pieces of paper, a cotton ball, blowing boats, an empty bottle, a stone, a stick, I...). Let's investigate them alone.
Children should predict which material is easiest to move, and which the hardest.(A suggested way, for controlling the blowing, is to give each child a straw and ask them if they can move the material by blowing at it).
- Ask them: Which material was easiest to move? Why?
- The children can classify the things into 'Easy to Move' and 'Hard to Move'.



BELGIUM, FINLAND,GREECE,ITALY,SPAIN AND TURKEY

QUESTION: CAN YOU CREATE A BLOWING BOAT AND MOVE IT THEN?

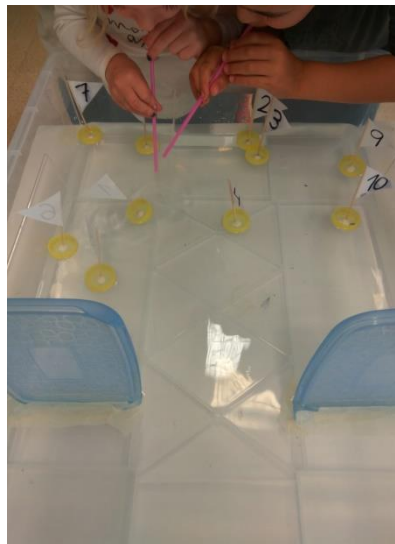
- Show pupils the materials they need.
- Ask pupils if they think they could create a blowing boat and move it with a straw.

Let pupils try their ideas.

- Before start creating them, show them some examples.
- Let's start number the caps, colour and decorate them. They could put them a pennant with the related number. Give them extra material for decorations.

FOLLOW-UP ACTIVITIES

- Infants could play a game in pairs. Put the boats on water, give every children a straw and let's start the game.
- They should order the numbered boats from one to ten.
- Let children enjoy the experience the first time. Then we can repeat the activity and find opportunities for observing and discussing different aspects:
 - What happens if you blow the straw hard? (wind speed)
 - What happens when you blow the paint softly? (wind speed)
 - What happens to the boat when you blow in short exhalations? /in one long exhalation?
 - Try cutting the straw in different lengths and blow. What happens?



BELGIUM, FINLAND, GREECE, ITALY, SPAIN AND TURKEY



- **Sources:**

- www.primaryscience.ie
- <https://sites.google.com/berritzegunenagusia.eus/zientzia-hezkuntza-ikaskelan/haur-hezkuntza>

- Berritzegune Nagusia. Carlos García Llorente

BELGIUM, FINLAND,GREECE,ITALY,SPAIN AND TURKEY



GEAR (Global and Environmental Awareness and Responsibility) – a Toolkit for Inclusive Environmental Education

Project Element: Wind

Tool: IS AIR IMPORTANT FOR US? WHY?

Age: 4 and 5 years old.

- **Objectives:**
 - To practice measurement and recording brief observations (if they watered a plant or not, how tall it has become) filling in a simple chart.
 - To get to know, through sharing ideas, observing and experimenting what seeds need in order to grow.
 - To realise that air is essential for living things (people, plants and animals).
 - To identify some of the causes of air pollution, including solutions on how to prevent it.

- **Previous knowledge:**
 - Pupils have already been experimenting with air: air is everywhere, air has no smell, we cannot see air, wind is moving air, we can create wind with our bodies, we can create unique artworks with wind, we can move light objects by blowing.

- **Basic transversal competences:**

B.C. 08 Competence for thinking, learning and communicating: Asking questions, making hypothesis, experimenting, observing, creating, selecting, and sharing ideas making use of verbal and non-verbal codes.

B.C. 09 Competence for initiative, entrepreneurship and communication: Taking initiative and managing initiative processes decisively and effectively: creating the blowing boats.

BELGIUM, FINLAND, GREECE, ITALY, SPAIN AND TURKEY

B.C. 10 Competence for learning and living and communicating together: taking part in interpersonal and group situations in a collaborative manner, recognising one's own and other's rights and duties, for the individual's and everybody's good.

B.C. 11 Competence to be yourself and communicate: Self regulation of body function: breath control. Rythm, intensity and direction.

QUESTION: IS AIR IMPORTANT FOR US? WHY?

- We need air to breath. Can you live without breathing?
(hold your nose and close your mouth. How long can you go without breathing?)



- What do plants need to grow?
 - Do plants need air? Do plants breath?
 - Do plants need sun?
 - Do plants need water?
 - Let's do a experiment and see what plants need to grow:

BELGIUM, FINLAND,GREECE,ITALY,SPAIN AND TURKEY

GROW AN AVOCADO FROM SEED

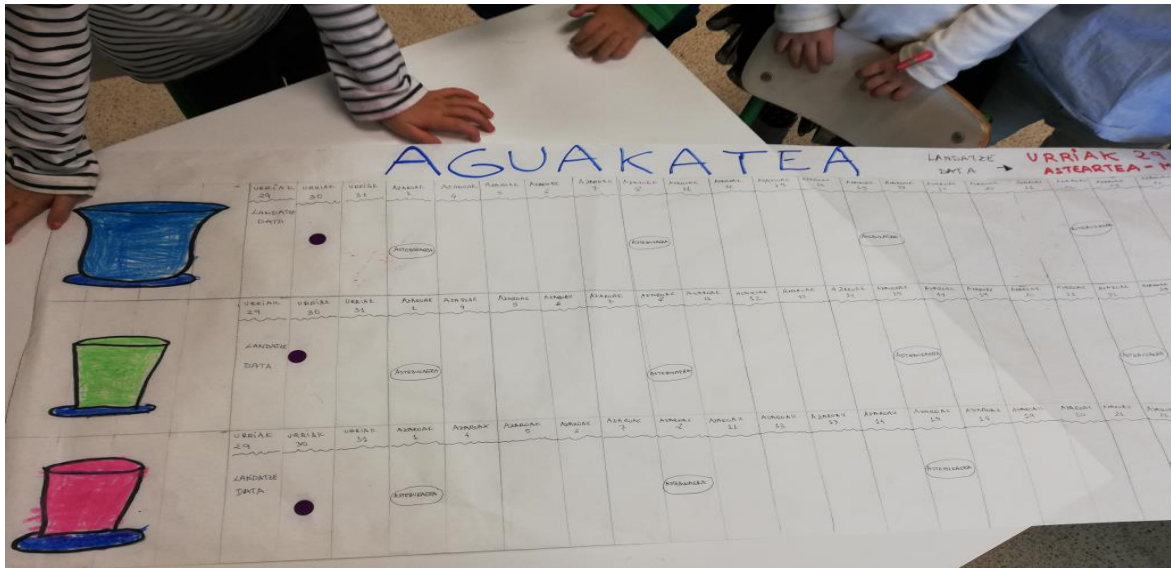


1. The seed will be given water and sunlight.
 2. The seed will be given water but not sunlight (light)
 3. The seed will be given water and sun but not air (oxygen)
- Write down your guess (hypothesis)
 - Do you think it will grow a lot, a little or not grow at all?



BELGIUM, FINLAND,GREECE,ITALY,SPAIN AND TURKEY

- Observe the seeds and write down what you see.



BELGIUM, FINLAND, GREECE, ITALY, SPAIN AND TURKEY

ZER BEHAR DA HAZITIK LANDAREA BIHURTZEKO?

VRFA - H₂O

HIPOTESIAK

EGURFA EKATIN

ERDA MO ATERAMO. MATTA LI

AGUAKATEA

LANDATZE DATA → URRIAK 29 ASTEARTEA - MARTIENA

FEELAKILAK → 4URTE A OTA 4URTE B

BAI ●
EZ ●

AGUAKATEA

LANDATZE DATA → URRIAK 29 ASTEARTEA - MA

BAI ●
EZ ●

BELGIUM, FINLAND, GREECE, ITALY, SPAIN AND TURKEY

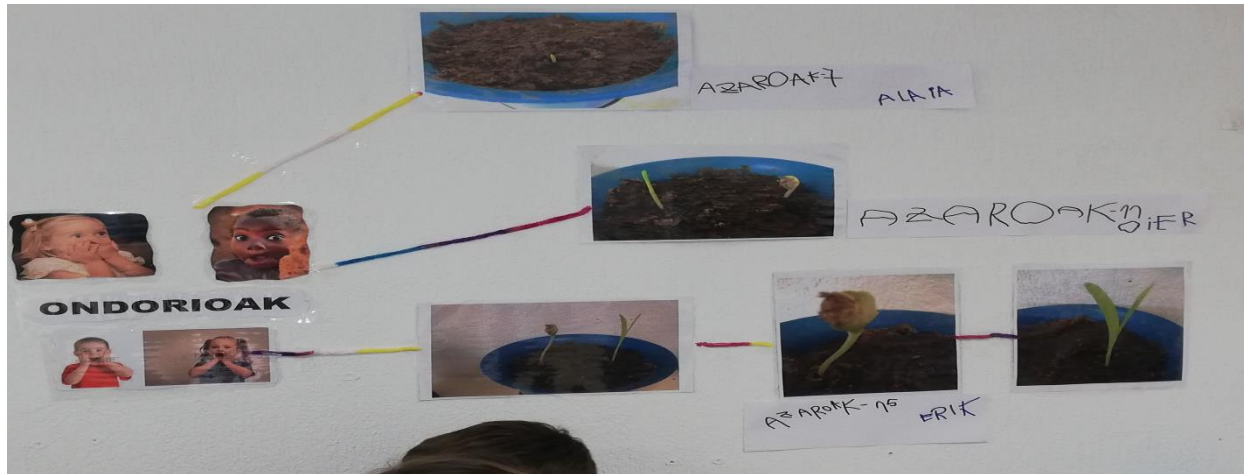
- Where our hypotheses correct?



- Results



BELGIUM, FINLAND, GREECE, ITALY, SPAIN AND TURKEY



- Draw conclusions
- Share the results

BELGIUM, FINLAND, GREECE, ITALY, SPAIN AND TURKEY

CLEAN AIR- DIRTY AIR: IS IT IMPORTANT TO HAVE CLEAN AIR?

When air is dirty we say that air is polluted.

- What causes air pollution? (cars, aeroplanes, aerosols from spray cans, factories, air conditioners and refrigerators...)
- What are the effects of air pollution for us? (It can make people sick. It can make it difficult to breath, respiratory infections, asthma attacks....)
- What can we do to help reduce air pollution?
 - Use buses and trains instead of cars, as they can carry a lot more people in one journey.
 - Walking or cycling whenever you can
 - Turning off lights when they are not needed and not wasting electricity will reduce the demand for energy. Less electricity will need to be produced and so less coal, oil and gas will have to be burnt in power stations, which means less air pollution and less carbon dioxide!
 - Most of the rubbish we throw away can be recycled, such as glass bottles and jars, steel and aluminium cans, plastic bottles and waste paper.

WHAT THINGS MAKE THE EARTH SAD? AND WHAT CAN WE DOTO MAKE THE EARTH HAPPY?

what can we do to help reduce air pollution?

Classify air pollutant and less pollutant everyday life actions and products.



BELGIUM, FINLAND,GREECE,ITALY,SPAIN AND TURKEY



- **Sources:**

- www.primaryscience.ie
- <https://www.totschooling.net/2018/04/happy-earth-vs-sad-earth-sorting.html>
- <https://sites.google.com/berritzegunenagusia.eus/zientzia-hezkuntza-ikasgelan/haur-hezkuntza>
 - Berritzegune Nagusia. Carlos García Llorente

BELGIUM, FINLAND,GREECE,ITALY,SPAIN AND TURKEY

WE NEED AIR TO BREATHE
dirty air can cause diseases.
 Major organs we use to breath: **lungs**

AIREA HARTU. AIREA BOTA. GURE HAKOSPOAK BEI LARNEAN!
 BAI, BAINA NOLA FUNTZIONATZEN DITU?

Arnasa hartzeko erabiltzen ditugun organo nagusiek, hau da, birkek, nola funtzionatzen diaten jakiteko, egin urrats hauek, eta esperientzia burututakoan, idatz itzazu ondorioak.

Nola egin:

- 1 Irakaslearen laguntzaz, moztu botila erditik.
- 2 Y edo T itzurako hodiari aurrez aurreko bi muturretan puxika bana lotu gomatzuekin. Y edo T itzurako hirugarren hodia zuloan kortxoan sartu eta kortxo botilaren ahoan jarri egindako muntaia moztutako botila barruan sartuz.
- 3 Botilaren beheko parte moztuan puxika jarri. Horretarako, aurrez moztu zati bat puxikari, eta egin korapiloa puntan.
- 4 Tira beheko puxikari puntatik. Behatu arretaz zer gertatzen den barneko bi puxikekin.
- 5 Askatu puxikaren punta. Behatu arretaz orain zer gertatzen den barneko bi puxikekin.

Materiaia:

- Plastifikatuko botila
- Y edo T itzurako hodia
- a puxika
- Zuloan kortxo
- gomatzuek

Irakaslearen azalpenak entzun odoren, idatz itzazu ondorioak.

.....

.....

.....

.....

Behatu irudiari arretaz, eta irakur ezazu testua, arnas aparatua, odolaren zirkulazio aparatuekin batera, gure gorputzean betetzen duen funtzioaren garrantzia ohartzeko.

- 1 Ahotik eta sudur-zuloetatik aire oxigenoduna hartzen dugu.
- 2 Laringea eta trakea hodietan barrena, birketaraino iristen da aire hori.
- 3 Trakea bi bronkioetan banatzen da, eta bronkioak, bronkiolo izeneko odarkaduretan. Bronkioloen bukaeran albeolo izeneko zakutxo batzuk daude.
- 4 Albeoloetan gas-trukea gertatzen da: oxigenoa odolera pasatzen da eta karbono dioxidoa odoletik albeoloetara.
- 5 Albeoloetara igaro den karbono dioxidoa kanporatu egiten dugu, arnasa botatzean.

karbono dioxidoa = CO₂ oxigenoa = O₂

Orain ulertzen al duzu zergatik hilko ginatekeen arnasarik hartu gabe?

Prozesu hori ondo-ondo ulertzen duzunean, adieraz ezazu zure laborategian jartzeko moduan; baina, lehenik, ziurta ezazu badakizula prozesu guztia ondo azaltzen. Horretarako, irudia aurrean duzula, ikaskideei azaldu ahoz.





BELGIUM, FINLAND, GREECE, ITALY, SPAIN AND TURKEY



GEAR (Global and Environmental Awareness and Responsibility) – a Toolkit for Inclusive Environmental Education

Project Element: Wind

Tool: Wind turbine model

Age: 7-8-9-10 years old (different ages built different models)

- **Objectives**

- To understand that we can use wind power to do work.
- To build a model of wind turbine to help pupils understand how wind energy works.
- To identify the parts of their wind turbine.
- To understand that alternative sources of energy such as wind energy, are renewable and help protect the environment.
- To collect, record, analyze and display data on a graph.

- **Basic transversal competences:**

- **B.C. 03/06 Competence for science and technology:** Using scientific and technological thinking in order to solve a range of problems in the creation of a turbine model.
Use and application of knowledge and methodologies that explain the natural world. These involve an understanding of the changes caused by human activity and the responsibility of each individual as a citizen.
- **B.C. 08 Competence for thinking, learning and communicating:** Asking questions, making hypothesis, experimenting, observing, creating, selecting, and sharing ideas making use of verbal and non-verbal codes.

BELGIUM, FINLAND,GREECE,ITALY,SPAIN AND TURKEY

- **B.C. 09 Competence for initiative, entrepreneurship and communication:** Taking initiative and managing initiative processes decisively and effectively: creating the turbine model.
- **B.C. 10 Competence for learning and living and communicating together:** taking part in interpersonal and group situations in a collaborative manner, recognising one's own and other's rights and duties, for the individual's and everybody's good.
- **B.C. 11 Competence to be yourself and communicate:** Self regulation of the learning process and of individual decisions, opinions and motivation to carry out duties and willpower.

- **Facts**

Wind is a clean, abundant renewable source of energy. Generating wind energy does not produce solid waste, hazardous waste, water pollution, air pollution, or greenhouse gases.

A windmill captures the motion energy (kinetic energy) of wind to make it useful to humans. In the case of grinding or pumping, the kinetic energy of wind is converted to mechanical energy or kinetic energy in a machine. In the case of a modern wind turbine, or a windmill with a turbine generator, the kinetic energy is transformed to electric energy by the turbine.

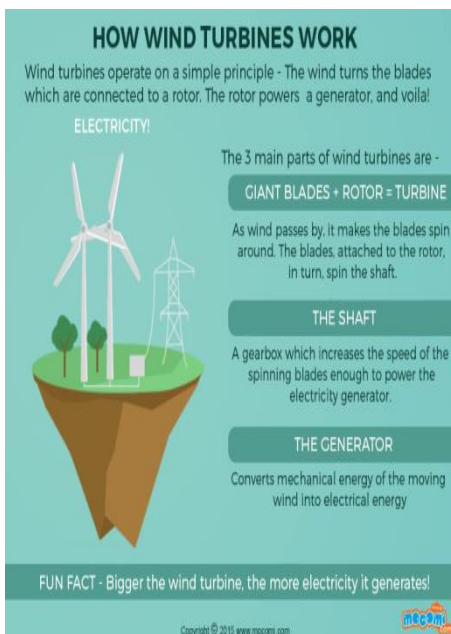
Wind blows on the blades and makes them turn. The blades turn a cylinder inside the box at the top of the turbine. The cylinder goes into a gearbox, to convert the rotational energy into electrical energy. In some places wind turbines are grouped together and they are known as wind farms. They are built on exposed sites like hills and mountains, or offshore. You can use a single smaller wind turbine to power a home or a school.

BELGIUM, FINLAND, GREECE, ITALY, SPAIN AND TURKEY

QUESTION: CAN WE USE WIND POWER TO DO WORK?

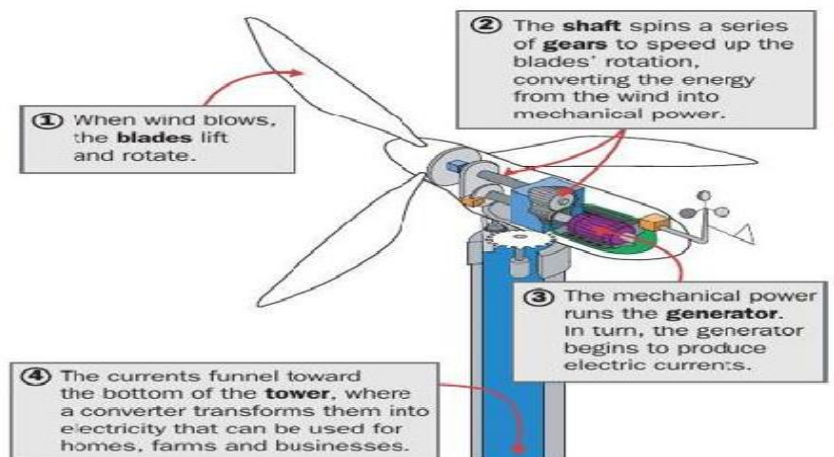
- **Getting ready**

- Open by inquiring what students know about windmills and the purposes for which windmills are used. (to pump water for cattle and wildlife, to make electricity; also – historically – to grind grain) Summarize these examples as all related to doing work. Define energy as the capacity to do work.
- Does anyone know the location of any wind farms near our town? Why are they located in those places?
- Why do we say that wind is a renewable source of energy?
- Show pupils a photograph of a wind turbine or a wind farm and explain how a wind turbine generates electrical energy.



How does a wind turbine work?

Wind turbines convert wind energy into clean electricity; even a small wind farm can generate enough electricity to power over 9,000 homes. Here's how a turbine works, simplified:



Materials you will need: A plastic bottle, scissors, glue, a candle, a piece of cardboard, screwdriver, cork, a stick, thread, a paper cup (or a yoghurt pot), coins, a thumbtack, sand (or rice, lentils) and a hairdryer.

BELGIUM, FINLAND, GREECE, ITALY, SPAIN AND TURKEY

Procedure:

1. Heat up the screwdriver and when it is hot enough drive two holes through the top part of the plastic bottle. (This step should be done by the teacher)
2. Make a wind mill
3. Push the thumbtack through the center hole of the pinwheel and through the top side of the stick. Glue everything.
4. Fill in the bottle with the sand and pass the stick through the holes in the bottle.
Cut a length of wooden thread that will allow a paper cup to hung from the stick.
5. Put some coins in the cup and make the blades turn by blowing into them.

We will test how much work our windmills can do (how many coins they can lift and how much time do they need to lift it.

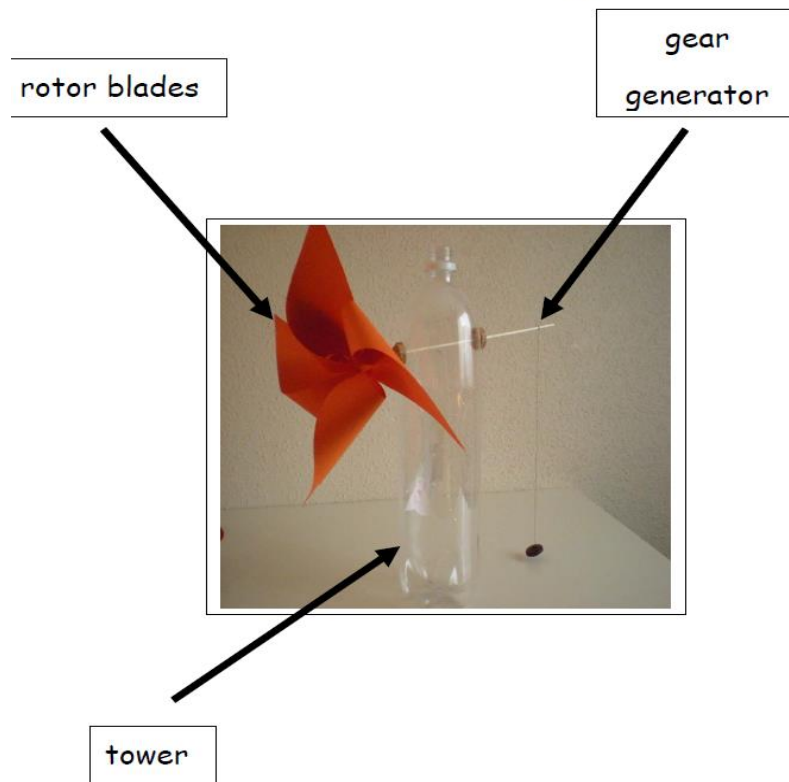
How many coins can we lift? We can try blowing ourselves first. Then we can try with different hair dryer levels and see what happens.

We can try to lift any other object. What do you think we could lift?

3RD GRADE STUDENTS TESTING THEIR WIND TURBINE



BELGIUM, FINLAND, GREECE, ITALY, SPAIN AND TURKEY



- Identify the parts of the wind turbine:

BELGIUM, FINLAND, GREECE, ITALY, SPAIN AND TURKEY

TESTING OUR WINDMILLS TO SEE IF THEY CAN DO WORK

Work is done when a force acts upon an object and the object moves from one place to another.

Teams will be testing how much work their windmills can do (how many coins they can lift and the time needed to do it). Demonstrate how to time the lifting of a penny.

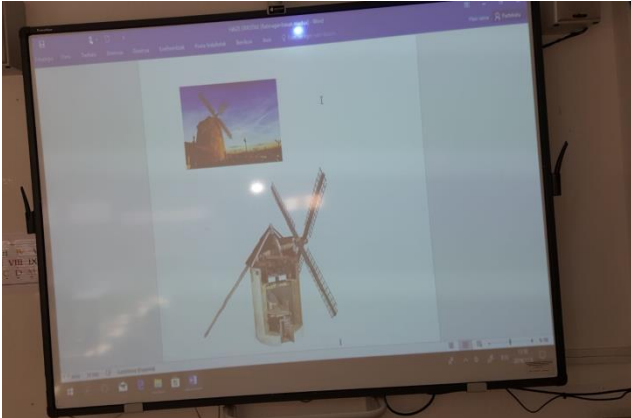
Students can experiment with lifting other objects.

Number of coins	Trial 1 (time)	Trial 2 (time)	Trial 3 (time)	Trial 4 (time)	Trial 5 (time)
0					
1					
2					
3					
4					
5					
6					
7					
8					

BELGIUM, FINLAND, GREECE, ITALY, SPAIN AND TURKEY

2nd GRADE STUDENTS

2nd grade students have been learning about the middle ages and they have discovered that windmills were invented in this period. They used the power of wind mostly to grind grain. But, nowadays, we still use windmills and the power of wind to produce energy, renewable energy.



BELGIUM, FINLAND, GREECE, ITALY, SPAIN AND TURKEY

6TH GRADE STUDENTS WORKED ALONG WITH A PARENT TO BUILD THEIR “WIND FARM”



- **Sources:**
 - Airea. Ez da magia, zientzia baizik:
<https://es.calameo.com/read/00355677199695e7004ec>
 - <https://sites.google.com/berritzegunenagusia.eus/zientzia-hezkuntza-ikasgelan>. Berritzegune N

BELGIUM, FINLAND,GREECE,ITALY,SPAIN AND TURKEY



GEAR (Global and Environmental Awareness and Responsibility) – a Toolkit for Inclusive Environmental Education

Project Element: Wind

Tool: Wind speed and direction

Age: 7-8-9 years old (different ages built different models)

QUESTION: WHICH WOULD HAVE BEEN A BETTER DAY TO FLY OUR KITES?

- **Objectives:**

- To demonstrate how wind speed and direction are measured.
- To collect data using classroom developed weather instruments.
- To record, analyze and display data on a graph.
- To Identify and explain the use of a wind sock, a weather/wind vane and an anemometer.
- To increase children's discourse about wind (wind names and description in the Beaufort scale)

- **Basic transversal competences:**

- **B.C. 03/06 Competence for science and technology:** Using scientific and technological thinking in order to solve a range of problems in the creation of a turbine model. Use and application of knowledge and methodologies that explain the natural world. Control and note the wind speed by different pupils. These involve an understanding of the natural changes caused by the weather conditions.
- **B.C. 08 Competence for thinking, learning and communicating:** Asking questions, making hypothesis, experimenting, observing,

BELGIUM, FINLAND,GREECE,ITALY,SPAIN AND TURKEY

creating, selecting, and sharing ideas making use of verbal and non-verbal codes.

- **B.C. 09 Competence for initiative, entrepreneurship and communication:** Taking initiative and managing initiative processes decisively and effectively: creating the different models of wind speed.
- **B.C. 10 Competence for learning and living and communicating together:** taking part in interpersonal and group situations in a collaborative manner, recognising one's own and other's rights and duties, for the individual's and everybody's good.

B.C. 11 Competence to be yourself and communicate: Self regulation of the learning process and of individual decisions, opinions and motivation to carry out duties and willpower.

- **Facts**

The wind can be measured by both its direction and speed. The direction of the wind can be determined by using a wind vane or a wind sock.

The **wind vane** works by pointing in the direction that the wind is blowing.

A **wind sock**, also called a wind cone, shows both the direction and speed of the wind. The direction of the wind is shown when the wind blows into the larger open end and the sock points the way the wind is blowing. If the sock is pointing to the west, then the wind is coming from the east.

The wind sock can also give an indication of the wind speed. If the sock is flapping about gently then the wind is only light, whereas if it sticks out in a straight line then the wind is much stronger.

Wind socks are commonly found at airports and seaports, but can also be found next to very windy roads.

An **anemometer** is the main instrument used to measure wind speed. It has three to four cups which rotate as the wind blows. The speed of the wind is determined by how many times the cups spin round in a given time. In a strong wind they will spin round very fast.

The Beaufort Scale is an **empirical** measure for the intensity of the weather based on wind power – its full name is the Beaufort Wind Force Scale. It was created in 1805 by the British naval commander Sir Francis Beaufort for measuring winds at sea and described how the wind affected the ships and waves. The scale has been adapted for use on land. The Beaufort scale, divides the winds strength into 12 forces.

BELGIUM, FINLAND, GREECE, ITALY, SPAIN AND TURKEY

***An empirical measure means that the information is based on observation.**

A **Magnetic Compass** is a navigation instrument that is used to indicate the geographical cardinal directions i.e North, South, East and West as well as inter cardinal directions (north-east, north-west, south-east, south-west). It is one of tools used by people to find ways (while on trekking).

- **Getting ready:**

- Start asking: Can you think of any signs that indicate there is wind? (wind felt on face, leaves in motion, wind moves flags/penants)
- Can we measure wind speed? and wind direction? How is wind measured?
- What do we use to measure wind direction? and to measure wind speed?
- Have you ever seen wind socks at airports or motorways? By observing wind socks, meteorologists know wind's direction and speed.
- We have installed a wind sock in our playground. We are going to observe the wind sock in the morning and after lunch and we are going to register our observations.
- 4 and 5 years old pupils will make wind socks.
- 5 years old and 4th grade pupils will make an anemometer.
- 4th grade pupils will make a compass.

BELGIUM, FINLAND,GREECE,ITALY,SPAIN AND TURKEY

● **LET'S MEASURE WIND SPEED AND DIRECTION.**

We will observe and record wind speed and direction twice a day for a few days and then we will analyze the data and decide which day would have been a better day to fly our kite.

This was our windsock the day we flew our kites:



(WE HAVE SUMMARISED THE 12 FORCES SCALE INTO 6 FORCES SCALE. IT IS IN BASQUE LANGUAGE)








MEASURING WIND SPEED AND DIRECTION

HAIZEAREN ABIADURA ETA NORABIDEA NEURTZEN

BEAUFORT ZENBAKIA	ANEMOSKO PIOA	ABIADURA KM/H	HAIZEA	IRUDIA	AZALPENEA
0		0-2	BAREALDIA		Itsaso barea, ispilua .modukoa. Kea zuzen gorantz.
1-2		2-11	BRISA ARINA		Olatuak apurtzen hasten dira.Haizea aurpegian sentitzen dugu. Hostoak mugitzen hasten dira eta xuxurlatu egiten dute. Haize orratzak mugitzen hasten dira. Keak haizearen norabidea erakusten digu.
3-4		12-28	BRISA BIZIA		Hautsa, hostoak eta papera jasotzen ditu. Adarrak mugitzen dira. Adar txikiak mugitzen dira. Olatu luzeak, itsaskiritxoa..
5-6		29-49	BRISA GOGORRA		Adar handiak mugitzen dira. Zuhaitz txikiak kulunkatzen hasten dira. Olatu handiak. Olatu gain zuria, itsaskirria. Itsasontzi txikiak arriskuan.
7-8		50-74	HAIZE BIZIA		Zuhaitzak mugitzen. Erresistentzia nabaritzen da haizearen kontr ibiltzerakoan. Olatu altuak, itsasoan bitsa. adaxkak eta adar txikia apurtzen dira. Elektrizitate kableen txistua entzuten da.
9-10		75-102	HAIZE GOGORRA/OSO GOGORRA		Olatu oso altuak. Itsasoa zuria. Itsasoak orro egiten du. Kalte arinak:zuhaitzak apurtu, teilatueta kalteak.
11-12		>103	EKAITZA/URAKANA		bortizkeri eta hondatze orokorra.

BELGIUM, FINLAND,GREECE,ITALY,SPAIN AND TURKEY

BEAUFORT-en ESKALA. HAIZEAREN ABIADURA ETA NORABIDEA NEURTZEN

	ANEMOSKOPIOA	HAIZEA	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	
0		BAREALDIA																			
1-2		BRISA ARINA																			
3-4		BRISA BIZIA																			
5-6		BRISA GOGORRA																			
7-8		HAIZE BIZIA																			
9-10		HAIZE GOGORRA / OSO GOGORRA																			
11-12		EKAITZA / URAKANA																			

- 1: Astelehena (goiz eta arratsalde)
- 2: Asteartea (goiz eta arratsalde)
- 3: Asteazkena (goiz eta arratsalde)
- 4: Osteguna (goiz eta arratsalde)
- 5: Ostirala (goiz eta arratsalde)

	ASTELEHENA		ASTEARTEA		ASTEAZKENA		OSTEGUNA		OSTIRIA
HAIZEAREN ABIADURA									
HAIZEAREN NORABIDEA									
HAIZEAREN ABIADURA									
HAIZEAREN NORABIDEA									
HAIZEAREN ABIADURA									
HAIZEAREN NORABIDEA									
HAIZEAREN ABIADURA									
HAIZEAREN NORABIDEA									

Haizearen abiadura neurtzeko ikurra (Beaufort zenbakia erabiliz)

- 0: 0-2 km/h – barealdia
- 1-2: 2-11 km/h - brisa arina
- 3-4: 12-28 km/h - brisa bizia
- 5-6: 29-49 km/h – brisa gogorra
- 7-8: 50-74 km/h – haize bizia
- 9-10: 75-102 km/h – haize gogorra/oso gogorra
- 11-12: >103 km/h – ekaitza/urakana



BELGIUM, FINLAND, GREECE, ITALY, SPAIN AND TURKEY

DIFFERENT IDEAS TO MAKE A WINDSOCK



BELGIUM, FINLAND, GREECE, ITALY, SPAIN AND TURKEY

IDEAS TO MAKE AN ANEMOMETER

Along with wind direction, meteorologists measure wind speed. Wind speed is a measure of how fast the air is moving. It is measured using an instrument called anemometer. As the spinning cups of an anemometer turn, the speed of the wind is determined. Our anemometer will tell us **approximately** how fast the wind is blowing.

Demonstrate the use of the anemometer with a hair dryer or a fan before going outside.

<http://www.ciесе.org/curriculum/weatherproj2/en/docs/anemometer.shtml>

(Mark one of the cups; this will be the one they use for counting when the anemometer spins. NOTE: When using this anemometer, 10 turns per minute means the wind speed is about one mile per hour. If possible, it would very useful to use a commercial anemometer to determine an approximate determination. For example, "when our anemometer reads 20 spins a minute, the commercial anemometer read 2 miles per hour.")

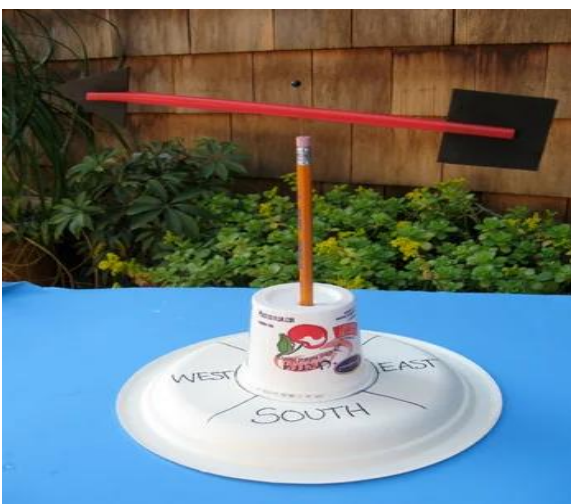
IDEAS TO MAKE A WIND VANE

How can you observe the direction of the wind? (leaves moving,....)

Is it important knowing the wind direction when flying a kite?

They turn with the wind, showing the direction the wind is coming from.

<https://www.wikihow.com/Make-a-Wind-Vane>



BELGIUM, FINLAND, GREECE, ITALY, SPAIN AND TURKEY

DO IT YOURSELF MAGNETIC COMPASS

<https://www.wikihow.com/Make-a-Compass>



- **Other Sources:**

- British Wind Energy Association: BWEA School pack.
- The Beaufort wind scale: <https://www.slideserve.com/gemma-hinton/the-beaufort-wind-scale>
- Pinterest.
- <https://sites.google.com/berritzegunenagusia.eus/zientzia-hezkuntza-ikasgelan/lehen-hezkuntza>
 - Berritzegune Nagusia.

BELGIUM, FINLAND,GREECE,ITALY,SPAIN AND TURKEY

WIND SOCKS MADE BY OUR 4 AND 5 YEARS OLD STUDENTS



BELGIUM, FINLAND, GREECE, ITALY, SPAIN AND TURKEY

4TH GRADE STUDENTS MAKING AND TESTING THE ANEMOMETERS



BELGIUM, FINLAND, GREECE, ITALY, SPAIN AND TURKEY

4TH GRADE STUDENTS MAKING AND TESTING THEIR COMPASSES



BELGIUM, FINLAND, GREECE, ITALY, SPAIN AND TURKEY

HOT AIR RISES (3rd grade)

Facts:

When air is heated, it expands as its molecules spread out away from each other. In other words, **hot air is less dense than cool air**. This means that hot air will rise above cool air, and that's exactly what you're seeing with this spinning snake! As the hot air rises up, cooler air flows in to replace it - but then the cool air gets heated by the candle, and the whole thing repeats. This cycle of moving air is called a **convection current**.

Instructions:

- Draw a spiral on a paper. (or teacher can give the pupils an already drawn copy for younger pupils)
- Cut out the spiral.
- Put the thread through the top of the spiral and tape it.
- Hold the spiral by the thread above the warm/hot heater.
- Watch the hot air rise and make the paper spiral spin.

Questions:

- What happens to the spiral?
- Why does the spiral spin?
- What does the heater do to the air?
- What happens to the warm air?
- Where does it go?

