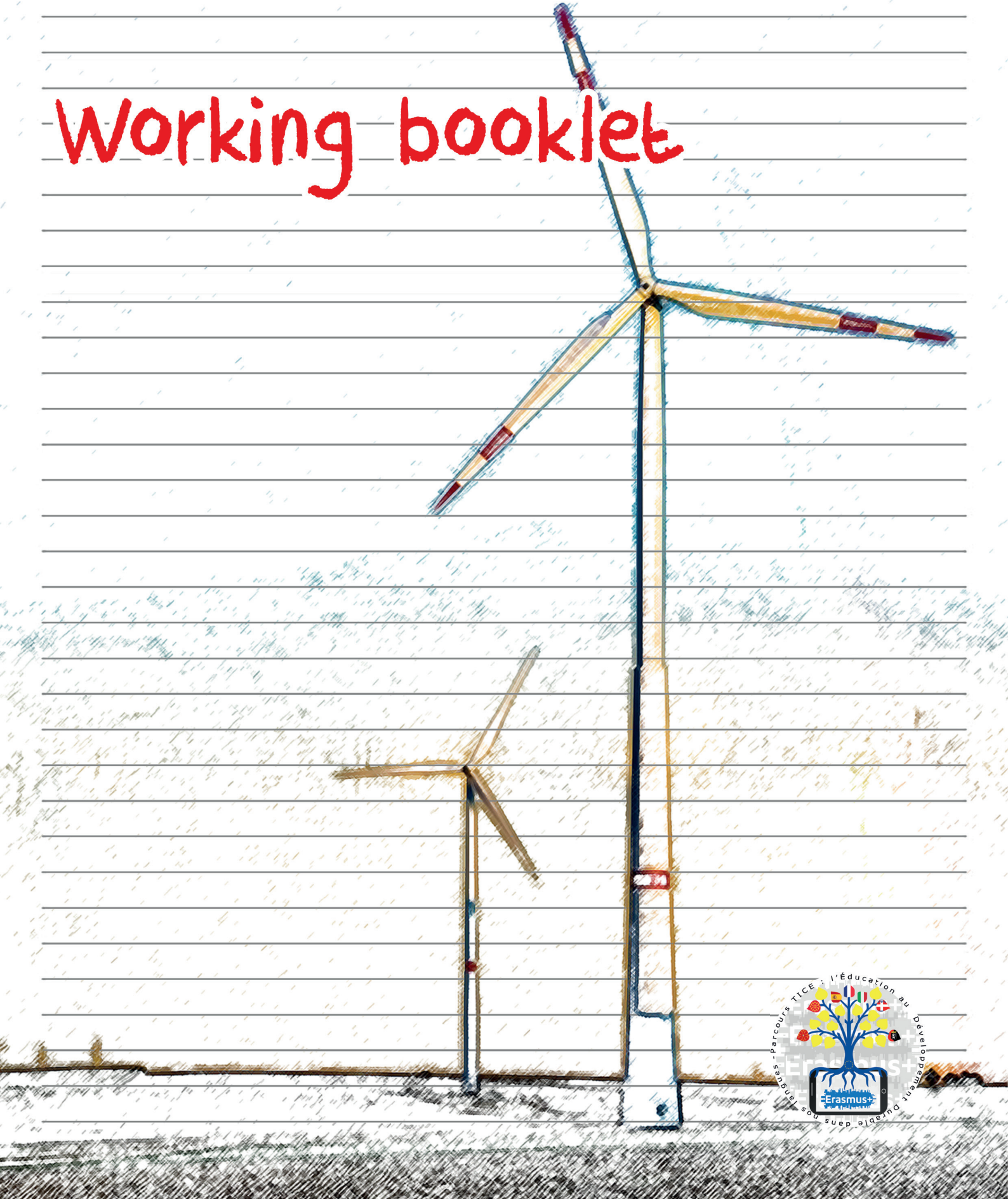
TICE: L'EDD DANS NOS LANGUES

N°2016-1-FR01-KA201-024097

Working booklet



Parcours TICE : l'Éducation au Développement Durable dans nos langues

L'air a-t-il un poids ? Combien de temps les déchets mettent-ils à se dégrader ? Comment réaliser un pluviomètre en matériaux recyclés ? Réalisé pour le projet ERASMUS + «L'EDD dans nos langues» par l'ANISN-VDA, ce carnet de 35 expériences à réaliser en classe ou chez soi est téléchargeable sur la Maleta d'Occitanica, le portail collectif occitan, en cinq versions linguistiques.

Le projet

L'aventure Erasmus + Parcours TICE « l'Éducation au Développement Durable (EDD) dans nos langues », conçue avec les conseillères pédagogiques d'occitan de l'Académie de Montpellier (DASEN) et pilotée par le Centre interrégional de développement de l'occitan (CIRDOC) a réuni durant deux ans (2016-2018) 8 partenaires à travers 4 régions européennes (Région Occitanie, Val d'Aran, Val d'Aoste et Piémont) dans lesquelles 6 langues sont parlées : l'occitan, le francoprovençal, le catalan, le français, l'espagnol et l'italien.

L'objectif ? Permettre aux enseignants et élèves de ces régions européennes de se rencontrer, d'échanger leurs expériences et de collaborer sur l'éducation au développement durable et l'utilisation des nouvelles technologies, en tirant parti d'un atout de taille pour mener cette réflexion à l'échelle européenne : quel que soit leur pays, les participants aux échanges apprennent et enseignent dans un environnement scolaire bi/plurilingue, c'est-à-dire que les enseignements y sont dispensés dans deux langues ou plus.

Retrouvez ces fiches dans toutes leurs versions linguistiques et toutes les réalisations du projet en ligne : **occitanica.eu/edd-lengas**

Les partenaires :

CIRDOC (Centre Interrégional de Développement de l'Occitan) - France
Assessorat de l'éducation et de la culture - Région Autonome de la Vallée d'Aoste - Italie
Collège Marcel Pierrel de Marvejols - Région Occitanie - France
Escòla Garona de Vielha - Val d'Aran - Espagne
ANINS-VDA - Vallée d'Aoste - Italie
Istituto Comprensivo Giacomo Matteotti de Rivoli – Piémont - Italie
LEGTPA Rabelais de Saint-Chély-d'Apcher - France
Istituzione scolastica Valdigne Mont-Blanc de Morgex - Vallée d'Aoste - Italie
DSDEN de l'Académie de Montpellier - France

Erasmus+

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The air

The air fills the space

Age of the students 6-10 years

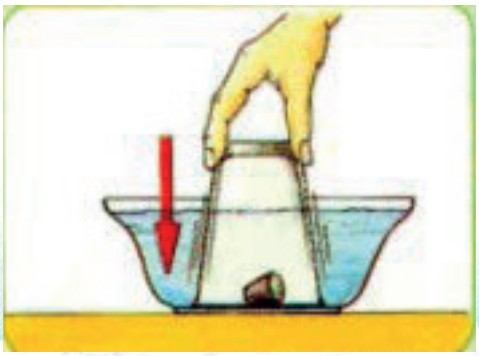
What is needed

- glass
- basin with water
- sponge
- glue or sellotape

What to do Fill the basin with water
Fix a piece of sponge with a sellotape or glue to the bottom of the glass
Soak the inverted glass in the water; the air resistance will be felt

What happens The sponge remains dry because the air contained in the glass isolates it
from the water; by tilting the glass, it will fill up with water and the
sponge will get wet

Reflexions points It is possible to transfer the air from one glass to another, paying
attention because the air is lighter than water and rises rapidly forming
large bubbles.



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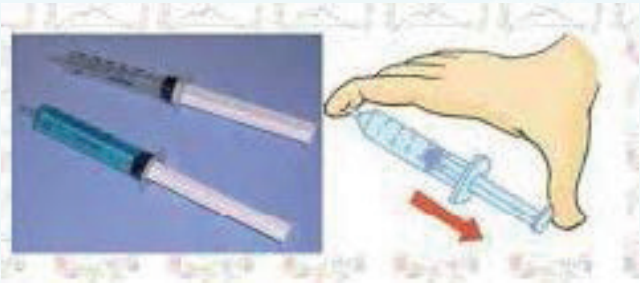
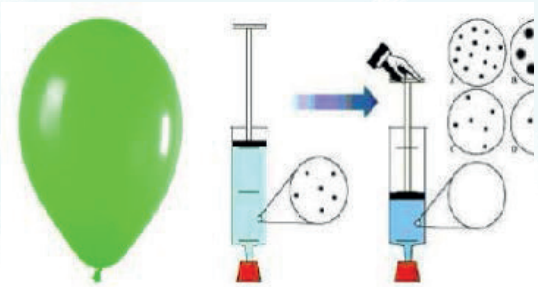
The air

The air can be compressed

Age of the students	6-8 years
What is needed	• syringe
What to do	Plug the hole of a syringe with a finger. Push the piston
What happens	The piston manages to go down for a while: the air is compressed because it is elastic
Reflexions points	Air occupies a space, but it is elastic and compressible, because the particles that compose it such as the molecules, are not dense





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The air

The air has a weight

Age of the students 6-8 years

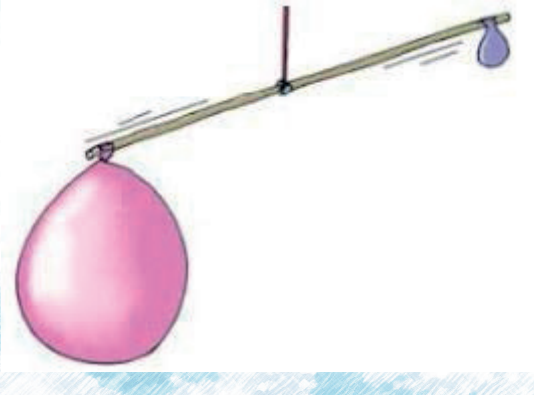
What is needed

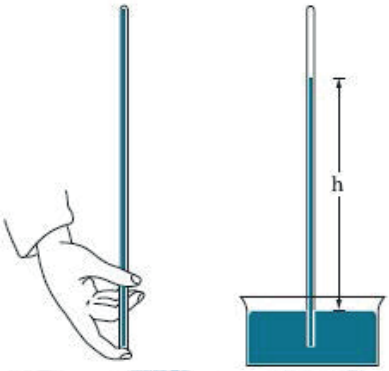
- coat hanger
- balloons

What to do Hang a deflated balloon from each of the two ends of the coat hanger
A perfect balance will be observed
Inflate one of the two balloons

What happens The hanger will lean on the side of the air-filled balloon. The hanger, like
a scale, tilts to the side where the balloon is inflated because the air has
a weight

Reflexions points Repeat the experiment with two more and less air-filled balloons,
The weight of the air can be measured with a barometer: the hot air
weighs less, because the molecules are less dense, the barometer goes
down and indicates bad weather.
The cold air weighs more, the barometer rises, indicating good weather





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The air

The bottle and the float

Age of the students

6-10 years

What is needed

- a bottle with a cut bottom
- a basin full of water
- a lid of a jar
- a balloon

What to do

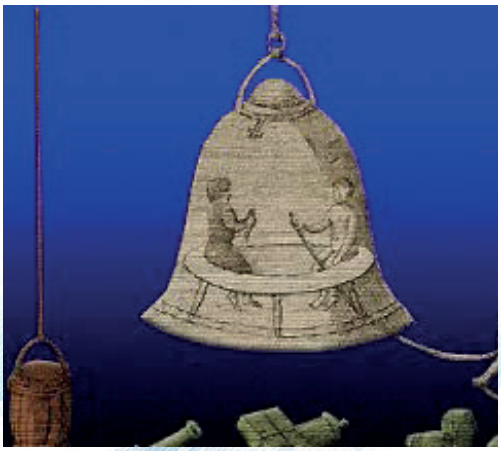
Fill a basin with water
Put the bottle, capped with the opening face down in the basin,
By pushing it to the bottom, the water cannot enter
Put the cap, overturned in the bottle, to float on the water

What happens

The float goes under the water level because the air contained in the
bottle cannot go out and keeps its volume

Reflexions points

By removing the cap, the water, and the float rise quickly place a
deflated balloon on the mouth of the bottle instead of the cap
Push the bottle on the bottom of the basin and the balloon inflates



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The air

The air engine

Age of the students

6-10 years

What is needed

- a toy car with wheels, built with recycled materials (Lego, ruler)
- a straw
- sellotape

  Or
- a balloon
- wire

What to do

Build a machine with a ruler / Lego and 4 wheels
Attach the straw on the toy car
Fix the air-filled balloon to a stick with sellotape or an elastic, blow into
the straw inflating the balloon
Put the thread in the straw
Fix the wire to two sides of the room
Inflate a balloon and close it with a clothespin.
Attach the balloon to the straw with two pieces of sellotape.
Remove the clothespin that closes the mouth of the balloon

What happens

The air comes out of the balloon and pushes forward, the toy car or the
balloon along the wire, carrying it along the wire like a rocket!

Reflexions points

This is the principle by which even planes and rockets are propelled
forward by expanded compressed gases

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The water

Water and other liquids

Age of the students 8-12 years

What is needed

- a toy car with wheels, built with recycled materials (Lego, ruler)
- a straw
- sellotape

  Or
- a balloon
- wire

What to do

Build a machine with a ruler / Lego and 4 wheels
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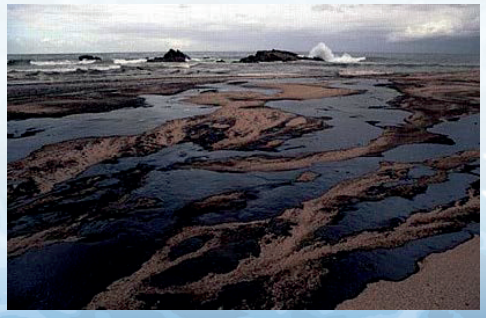

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The water

Water and solids

Age of the students

6-12 years

What is needed

- hot and cold water
- 7 plastic bottles
- scissors
- 8 tablespoons
- flour
- coarse salt
- Sodium bicarbonate
- Sugar
- talcum powder
- cocoa
- sand

What to do

Prepare containers by cutting the bottom of the plastic bottles. Dissolve a spoon of each material into the water

What happens

Some materials melt in the water, others do not
Compare the different conducts
Identify solutions, when the solute completely melts and mixes, when it does not happen

Reflexions points

The materials have different properties, they «bind» together with water, and they can mix and separate
It is possible to check if the different materials dissolve more easily in hot water
It is possible to identify and experiment with possible methods for separating the mixed materials, recovering them both

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The water

Surface tension

Age of the students

10-12 years

What is needed

- a basin full of water
- a pin
- a piece of blotting paper
- a spoonful of liquid detergent
- talcum powder

What to do

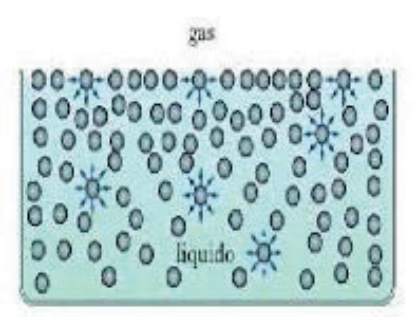
Fill the glass with water to the brim
Place the needle on the water surface: it will tend to sink
Place a piece of blotting paper on the surface of the water
Gently put the needle on the blotting paper
With the help of a rod, the blotting paper is thoroughly drained
The needle floats, although it is made of steel
Then add a little 'detergent, observing what happens

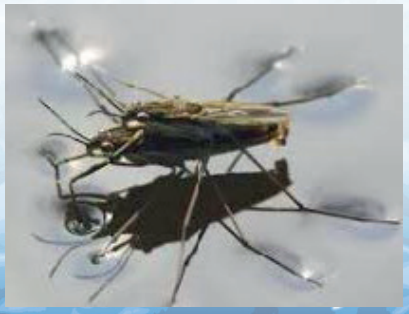
What happens

The pin floats on the water because there is a force on the surface, the surface tension, which keeps it afloat. The added detergent causes the pin to sink because it has the
characteristic of reducing the surface tension. Let some talcum powder fall onto the water surface. Observe that the talcum powder remains on the surface, but if you touch it with a finger soiled with detergent, the talcum powder moves away because the
superficial film, made visible by the talcum powder, is interrupted by the action of the detergent, which decreases the tension at the point where the finger dives. On the rest of the surface the tension is greater and attracts and retains the talcum powder

Reflexions points

The particles of water are linked to each other, in all directions within the mass of water. On the surface, where «particles» are missing, the bonds are
concentrated between the particles on the surface and therefore the bond is stronger, able to support a light body. Detergents are called surfactants. Surfactants dispersed in the seas, rivers and lakes cause a decrease in surface tension. The small insects that walk on the water can thus have the same conduct of the talcum powder





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The water

Water and pressure

Age of the students

10-12 years

What is needed

- plastic bottle
- ruler
- scissors / nail
- container pan
- water
- sand

What to do

Mark points on the outer side of the plastic bottle, at different heights and about
3-4 cm apart from each other, making sure that:

- at least 5 points are marked;
- he lowest is about 6 cm from the bottom of the bottle;
- the highest about 10 cm away from the upper edge.

With the help of a nail, the bottle is pierced in the points indicated with small holes, all the same and well aligned. The holes are closed with adhesive tape, so that each hole can be opened or closed independently. Put the bottle in the pan, filled with a thin layer of sand. Fill the bottle with water.Observe the water coming out of the holes

What happens

The water comes out from the holes with different intensity-pressure with a jet falling into the sand at a certain distance from the base of the bottle. Measure this distance. Remove the adhesive tape from the holes by measuring the distances of the casting

Reflexions points

The Stevin principle applies to all fluids and explains the pressure of the water column, as that of air
It is possible to make a table in which the values of heights h and of the distances d are reported.

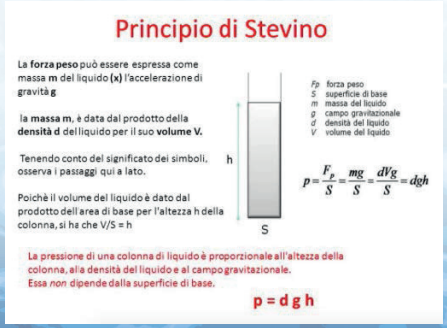
- the gush of water that emerges from each hole describes a parabolic

shape

- if no more water is added to the bottle, the amplitude of the parabola

described by gush decreases

- the gushes are the longer the lower the hole is; the water has a weight and presses on the walls with a force that is greater and greater and the column of water that presses on the hole



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The water

Water and chemical reactions

Age of the students

8-12 years

What is needed

- a transparent bottle made up of plastic and equipped with a lid
- glucose powder
- Sodium or Potassium Hydroxide
- Methylene blue

What to do

Prepare a solution of 5 g of glucose in 200 cc of water
Add 6 g of NaOH or KOH, stir quickly to make it melt without depositing
on the bottom of the bottle
Pour several drops of methylene blue solution, the liquid will acquire an
intense blue colour

What happens

Plug the container
Wait until the solution clears and dives colourless
Vigorously shake the solution
It will turn into blue again to return colourless again after being left to rest for a couple of minutes

Reflexions points

A chemical reaction occurs and becomes reversible with oxygen. In the solution there is an indicator, methylene blue, which can have two
forms: oxidized (blue) and reduced (colourless).
The dye is initially present in the reduced form but, by stirring it, it comes into contact with atmospheric oxygen which oxidizes it. Holding the container still, the methylene blue is slowly reduced to the colourless form by the present reagents.

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The ice

Ice floats on the water

Age of the students 8-12 years

What is needed

- a graduated glass
- water
- a thermometer,
- a scale
- a fridge

What to do Measure the weight of the graduated beaker
Fill the graduated cup with water
Measure the volume precisely, marking it on the glass with a marker
Measure the gross weight; calculate the weight of the water
Check the specific weight
Bring the glass to the freezer at 0 ° C, measuring the temperature periodically
Measure the ice volume
Measure the gross weight, calculate the ice weight

What happens The specific ice weight is lower than that of water
The ice floats on the water

Reflexions points It is possible to understand the phenomenon by analysing the «triangular» shape of the water molecules, disordered in the water, ordered but less dense in the ice. Using triangular paper figures it is possible to demonstrate the concept of disorder / order, liquid / solid state and its occupied surface, with the consequent higher / lower density of matter. Analyse the consequences, considering natural phenomena, ice surfaces of lakes and rivers, icebergs and the benefits for the survival of aquatic organismsne

BY NC SA

The ice

Ice and salt

Age of the students 6-8 years

What is needed
- 4 ice cubes
- 4 plastic cups
- salt
- a spoon

What to do Put a cube in each glass.
In the first glass, leave the cube without adding anything.
To add:
- a tablespoon of salt in the second glass
- 2 tablespoons of salt in the third glass
- 3 tablespoons of salt in the fourth glass

What happens After about 10 minutes it is observed that the salt melts the ice faster.
After 20 minutes the cubes with the salt have melted much more than the salt-free one.
After 40 minutes the cubes with the salt are completely melted, while in the one without salt there is still.

Reflexions points Salt lowers the freezing temperature of the water
It therefore dissolves the already formed ice and prevents it from forming another one. Then, the sea remains liquid even below 0 ° C, allowing the life of marine organisms and for this reason it is used as antifreeze

BY NC SA

The ice

The iceberg and the north polo ice

Age of the students 6-12 years

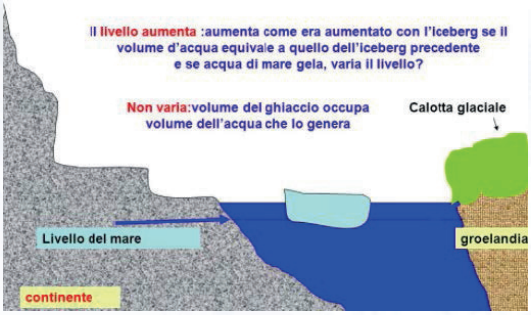
What is needed

- ice cubes
- plastic container
- water
- blue food colouring
- blotting paper

What to do Put 2/3 ice cubes, possibly coloured with blue food colouring, fill the container with water to the top, wait for the ice to melt. Put the container on the blotting paper

What happens The volume of melted ice is slightly lower than that of solid ice, so the water does not come out of the container, blotting paper remains dry

Reflexions points In the case of the melting of the pack ice or of the North Pole ice, due to
the rise in temperature, the sea level will not rise



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The ice

The ice of the glaciers and the south pole

Age of the students 6-12 years

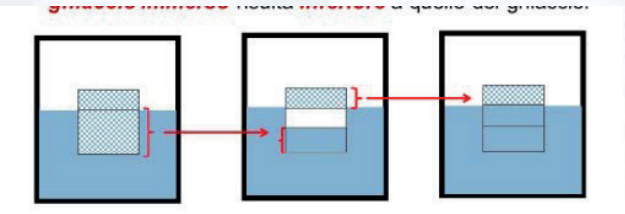
What is needed

- ice cubes
- plastic container
- water
- blue food colouring
- towel rolls
- a ruler

What to do Fill the container with water up to the edge
Place the ice cube on the ruler and then place it on the edge of the container
Wait for the ice to melt

What happens Melt water from the ice cube flows into the container and causes the
water to overflow

Reflexions points In the case of the ice melting of the continental glaciers or of the South Pole ice cap, due to the increase in temperature, the sea level will rise.



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The ice

White glaciers and black glaciers

Age of the students 10-12 years

What is needed
- about twenty ice cubes,
- a piece of dark woollen fabric
- two trays
- a lamp

What to do Place 10 ice cubes on each of the two trays
Cover one of the two trays with the piece of wool
Place the lamp on the two trays
Check every 10 minutes how much ice has melted

What happens Unprotected ice melts first

Reflexions points The «black» glaciers, covered by debris and rock fragments, are more protected from solar radiation and therefore last longer; they are experimenting with geo-textiles that protect glaciers and slow down fusion, in particular to protect their function as water reservoirs

BY NC SA

The soil

How the soil is composed - quantitative analysis

Age of the students 6-12 years

What is needed
- different soils (grain size, origin, colour, consistency, etc.)

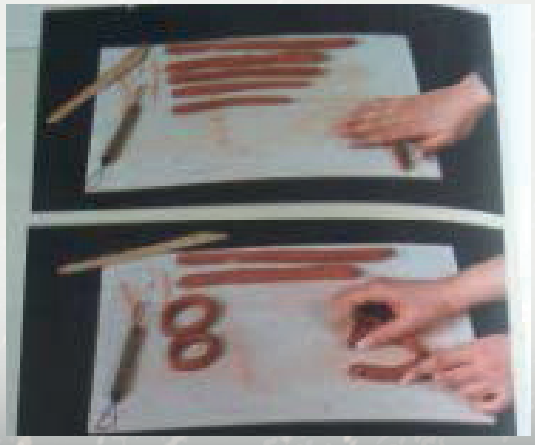
What to do Press each type of soil with your hands and make small rolls

What happens Depending on the size of the grains (texture) that make up the soil, you will feel different sensations to the touch and you will get different results

Reflexions points **Sandy soil:** good mechanical properties, not very fertile, very permeable
When dry: granules recognizable to the touch
When wet: impossible to get a compact shape

Silt soil: not very permeable, not very coherent
When dry: it is possible to obtain a form that resists to light manipulation
When wet: it is possible to form small cylinders, even thin ones, which break when bent to u shape

Clay soil: waterproof
When dry: it is soft and manageable, almost plastic
When wet: it is possible to form cylinders and rings without breaking them until it is sufficiently moist



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The soil

How the soil is composed - quantitative analysis

Age of the students 10-12 years

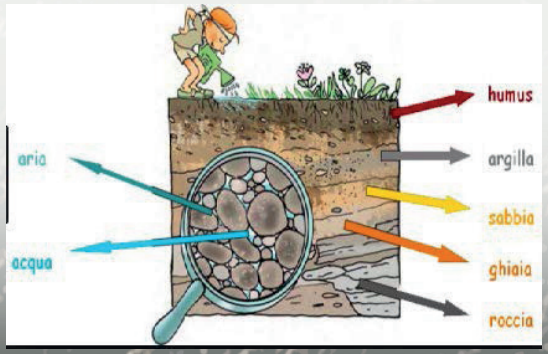
What is needed

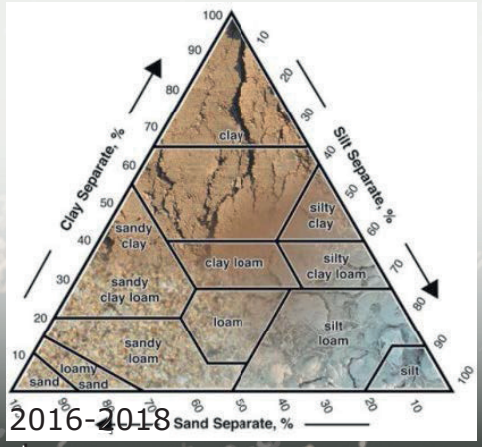
- 1 transparent vase
- 1 scoop
- and gathered in a garden, in the vegetable garden, in a wood.
- water
- sieve with 2 mm meshes

What to do Collect the chosen soil sample with a scoop
Pour 3 parts of water and 1 of soil into the transparent jar
Mix well and allow to sediment
After 40 seconds, measure the height of the sedimented material level - A
After 30 minutes, take the measurement of the sedimented material - B
After 24 hours the measure C
Determine the thickness of the main layers: C-B clay layer;
B-A silt layer
A layer of gravel and sand
Separate the gravel from the sand with a sieve and determine their relationship
Calculate the content of each component of the examined soil in %

What happens The soil is composed of quantities of particles of different sizes (granulometry); with this simple experiment it is possible to separate the main soil components and evaluate the content of each component in%

Reflexions points It is useful to compare different terrains, how the composition and proportions of the components change, and to make hypotheses about the properties of the terrain





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The soil

Sedimentation

Age of the students 8-12 years

What is needed
- plastic bottle
- Imhoff cone with supports
- water
- a few tablespoons of mixed soil

What to do Fill the bottle with ¾ water
Add the soil
Shake the bottle
Pour the contents into the Imhoff cone
Let it settle

What happens Observe after 5 minutes, 1 hour, 24 hours, until the water is clear
«horizons» (layers) of different composition are formed

Reflexions points The materials suspended in water tend to settle with speed and therefore with different timing depending on the size of the particles / grains and the specific composition / weight, forming parallel layers

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The soil

Permeability

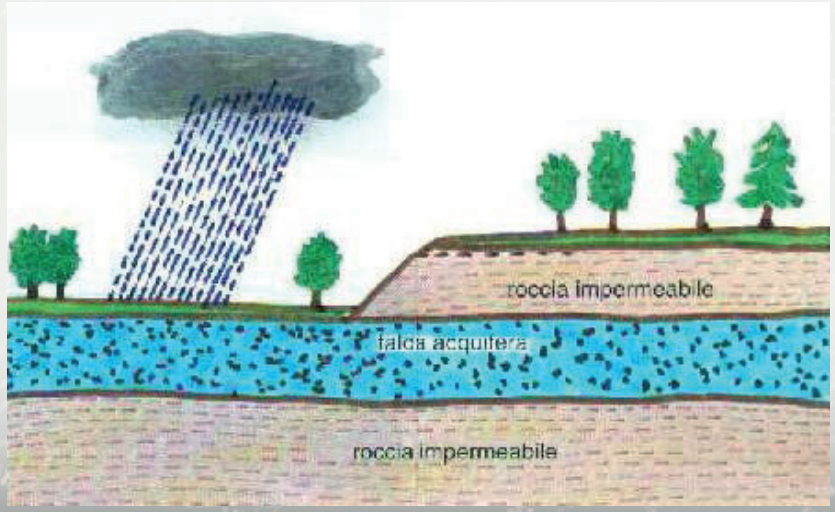
Age of the students 8-12 years

What is needed
- plastic bottle with water
- tray for water containment
- 2 models of sections with
  - gravel, sand and silt
  - gravel, sand and clay

What to do Pour water into the two models, making sure to keep them vertical
Observe the conduct of water through the layers

What happens The gravel and the sand allow the passage of water, the silt in long times, the clay does not allow it

Reflexions points The soils can be impermeable to the passage of water or they can let it filter. It depends on their composition
The flow of groundwater and the formation of the groundwater depend on this.



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The soil

Rain simulator

Age of the students 8-12 years

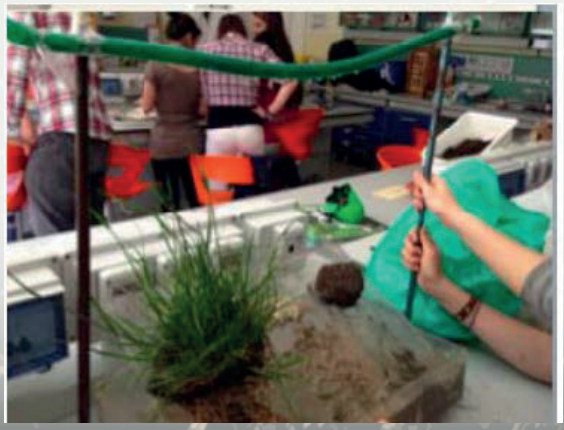
What is needed

- plastic bottle with water
- tray with support placed on a slope, or rain simulator
- tank with water connected to a perforated cannula to simulate the
- rain
- two stands
- different soil samples: soil with grass, clay in blocks, loose sand

What to do Place the three materials on the sloping substrate
Place the tank on a stool and fix the cannula to the appropriate height through the two stands, plug the cannula at one end
Open the tank tap with different intensities
Observe the conduct of different materials

What happens Soils have a different conduct compared to the outflow of water: sand and clay are washed away
The grassy ground is more resistant

Reflexions points Soils behave very differently in the presence of surface runoff, also depending on their slope.
The action of roots and vegetation cover are crucial for ensuring the stability of the slopes



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The energy

Chemical energy: producing energy with salt and aluminium

Age of the students 8-12 years

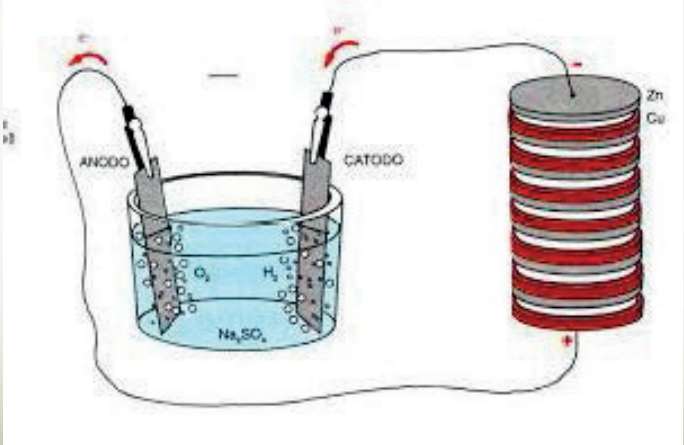
What is needed
- Copper sulphate
- Sodium chloride
- a strip of aluminium foil.
- two glass jars

What to do Prepare a concentrated solution of copper sulphate in a glass container
Prepare a sodium chloride solution in a second container
Dip strips of aluminium foil into the two containers

What happens Nothing happens in the two containers
Mix the two solutions: a tumultuous reaction will begin
The solution will heat up while the aluminium will cover with a reddish layer of metallic copper and will end up completely worn out

Reflexions points The exothermic reaction, oxidation of aluminium with reduction of the copper, depends on the greater reactivity of the aluminium compared to the copper so that, putting in a solution of copper salt, the metallic aluminium tends to dissolve and passes into solution as an ion, while the copper switches between the ion to the metallic state, so aluminium oxidizes while copper is reduced

Like most exothermic reactions, this one needs to trigger an activator to start it; in this case it is sodium chloride.



BY NC SA

The energy

Mechanical energy - friction and heat

Age of the students 8-12 years

What is needed
- a wooden board with a recess,
- a thimble
- sand
- a string
- a thermometer

What to do Insert the thimble in the recess of the board with the opening facing
upwards.
Put some sand in the thimble and measure the temperature with a thermometer
Pass a string around the thimble and move the string in way to produce a go and go movement

What happens The friction between the thimble and the lanyard produces a heating that is detected with the readings of the thermometer

Reflexions points Thus, one of the many transformations of energy occurs, from mechanical energy into thermal energy. This the friction produced by man and used to ignite the fire in antiquity.
The transformation is demonstrated and measured with the joule whirlpool

BY NC SA

The energy

Solar energy - the solar energy oven

Age of the students 8-12 years

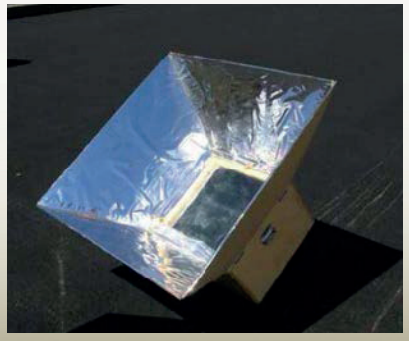
What is needed

- cardboard
- aluminium sheet
- glue
- glass jar
- water resistant black paint
- transparent plastic bag (like those for the freezer)
- brush
- scissors
- stapler (or sellotape)
- thermometer

What to do Cut a rectangle of cardboard and aluminium foil of about 40 cm x 60 cm. Spread the glue on one side of the cardboard (with a brush or with your finger). Glue the aluminium taking care not to create folds
Aluminium is used because it is a material that allows us to reflect more sunlight
Fold the piece of cardboard in two, leaving the covered part with aluminium inside. Cut the cardboard along the fold, about 15 cm to the right and 15 cm to the left
Fold the sides to the right and left inwards overlapping a part, so as to form an open box upwards, stopping them with the stapler or the sellotape

What happens Concentrating the sun's rays, you can use the tool as an oven folding the cardboard so that it forms an angle of maximum 90 ° focus the sun's rays in a single central point, which will be our «cooking» point. Using a transparent glass jar able to filter the sun's rays inside, and black-coloured externally because black allows to absorb the sun heat as much as possible, you can heat the water.

Reflexions points These models of ovens have been distributed in Africa and are allowing food to be cooked, therefore with greater hygiene, without the consumption of fuels



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The energy

Mechanical energy - water turbine

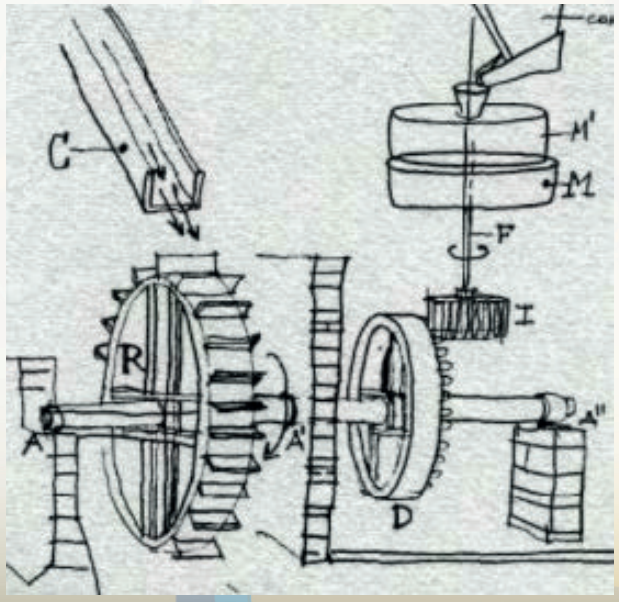
Age of the students 6-12 years

What is needed
- plastic bottle
- straws
- awl / scissors
- wire
- water

What to do Cut the bottle by removing the top
Pierce the bottle at the base, with well-spaced holes (two are enough if you use jointed straws)
Insert the straws into the holes, checking that the length and distance are the same
Hang the bottle with a thread, leaving it free to rotate, preferably on a sink
Fill it with water

What happens If the straws are properly arranged, the bottle starts to turn, possibly with a little help at the beginning

Reflexions points The same principle applies to power plant turbines, but is also used to make mills, fountains, and so on. This is the third law of newton (each reaction corresponds to a reaction...)



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The energy

Wind energy

Age of the students 6-10 years

What is needed
- 2 polystyrene balls
- 3 plastic tablespoons
- a straw / wooden skewer
- support for a ball
- hairdryer

What to do Fix the two balls at the end of the skewer
Fix / insert the handles of the teaspoons at the same distance in a polystyrene ball, with the concavity in the same direction
Lay the balls / skewers / spoons system on the support

What happens Rotate the spoons and the system with the hairdryer
It is possible to vary the intensity of the air jet and check the number of rotations in the same period

Reflexions points The instrument, as well as a windmill, is a rudimentary anemometer, which allows the measurement of wind speed

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Waste

The time of waste degradation.

Age of the students 6-12 years

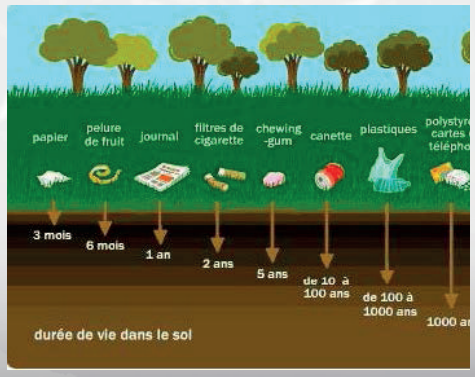
What is needed

- organic waste (salad leaves and peels)
- an aluminium can and a small piece of aluminium paper
- glass containers (bottles, jars, etc.)
- different types of paper
- several plastic bottles, shopping bags and some tetra-packs.
- a piece of uncultivated lawn or a container, better if transparent,
- with earth
- a shovel
- a sprayer for water

What to do Place each waste (in small quantities) in different pits and cover it with
the same amount of soil
Keep the soil moist
Check periodically if transformations occur in different materials

What happens Organic waste and paper undergo transformations and alterations in a
short time
The other materials remain unchanged for the entire time of the observation

Reflexions points Some environmental factors such as temperature, humidity and sunlight can affect the transformations and help the decomposition, but the times are measured in order of years, tens and hundreds for some.



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Waste

Recycle the materials to produce objects of common use: the paper

Age of the students 6-12 years

What is needed

- old newspapers, recovery paper
- a big bucket
- wire mesh and coarse twine to build sieves
- acrylic colours
- blender, dry cloths and wooden boards
- at will: pressed leaves and flowers, coloured tissue paper, plastic pieces of coloured bottles, natural fibres (wool and cotton)

What to do

Break up some sheets of old newspapers and scrap paper
Immerse them to macerate in water
Blend the macerated paper to make a mush
Mix a little mush with the water in a container
Add a few drops of acrylic colour and mix
Soak a small sieve, built with wire mesh and twine, into the container
Drain to remove excess water

What happens

A sheet of coloured paper forms on the sieve
Place the sieve on a dry cloth, dab the excess water and remove the sheet from the edges of the sieve
Cover each sheet with wooden boards to press them well and let them dry better

Reflexions points It is possible to mix different materials such as leaves, petals and so on in the mix.

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Waste

Recycle materials to produce gamesper

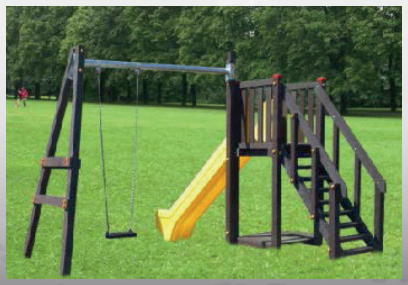
Age of the students 6-8 years

What is needed
- plastic bottles,
- scissors, cardboard

What to do Cut the plastic bottles to produce the different objects, as in the figures

What happens It is possible to produce objects of various types, with different colours and functions

Reflexions points Recycling plastic bottles allows you to reuse the material, both for small games and especially for producing new items, such as benches, fleece fabrics, garden toys



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Waste

Recycle materials to produce musical instruments

Age of the students 6-8 years

What is needed
- various recycled materials:
  - plastic bottles
  - cardboard tubes,
  - jars, caps, boxes, cans

What to do Compose the different materials

What happens It is possible to make numerous percussion instruments, tambourines, maracas, shakers

Reflexions points The imagination and the materials allow creating an orchestra. Many suggestions can be found on the web.

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Waste

Recycle materials to produce scientific instruments - a rain gauge

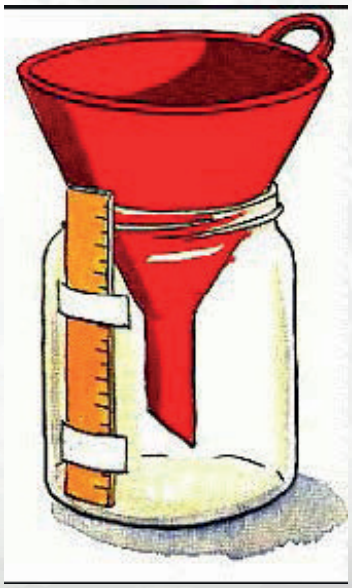
Age of the students 8-12 years

What is needed
- a plastic bottle
- scissors / cutter
- ruler

What to do Cut off the top of a plastic bottle to make a funnel and a container. Put the funnel in the container
Place the tool between a few bricks so that the bottle can resist wind

What happens Every morning check how much rain has fallen into the rain gauge and measure your level with the ruler
Repeat the same operation daily, write down the amount of water collected and compare them, from day to day and from month to month

Reflexions points It is interesting to compare the data obtained with the weather forecast and calculate the amount of water falling per unit area, note the area of the funnel



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The Berlese funnel

Age of the students 8-12 years

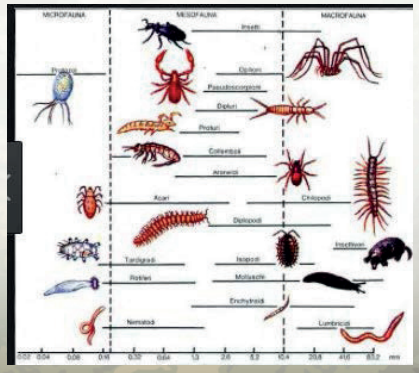
What is needed

- approximately 300 g of soil
- funnel
- container to support the funnel
- lamp
- small Petri type container
- Ilcohol
- Lens

What to do Place the sample of uncompressed soil in the funnel
Pour a little alcohol into the container
Place the funnel on the support
Place the lamp on top of the funnel and the container

What happens After a few hours / days the soil animals move away from the light and from the heat of the lamp and fall in a small container placed below, containing alcohol
It is useful to make observations of the animals with the help of the lens.

Reflexions points The falling organisms are micro-arthropods.
Each group of arthropods has characteristic times of fall: collembolans usually fall earlier, mites delay.
It is possible to verify that the soil contains organisms even when they are not visible; it is possible to make considerations on the life and the
alimentary cycle of these organisms.
It is possible to recognize that the soil is a complex system.



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The seeds breathe

Age of the students 6-12 years

What is needed

- seeds of beans, lentils, chickpeas
- 5 glass containers
- BBT (bromothymol blue) acid indicator
- water

What to do Fill the bottom of three containers with 3 types of seeds
Cover with water
Boil some bean seeds and place them in a container, cover with water
Add a few drops of BBT to all prepared containers up to which the water turns blue. Prepare a container with only water and BBT (blank test) let stand for 24
hours, then observe. After a few hours / days the soil animals move away from the light and from the heat of the lamp and fall in a small container placed below, containing alcohol
It is useful to make observations of the animals with the help of the lens.

What happens The solution will progressively turn from blue into yellow because the BBT is an indicator that turns into yellow in the presence of a non-strong acid such as carbon dioxide

Reflexions points It is possible to recognize that plants also breathe, not just animals. Bromothymol blue is an indicator that colours a solution blue if it is basic, green if it is neutral, yellow if it is acidic.
It is possible to demonstrate the conduct of CO2 by blowing into a container containing a BBT solution. It is not recommended to use the straw to blow, you may aspire

Prova in bianco: acqua e BBT Lenticchie in acqua e BBT Dopo 24 h

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The environnement

The plants breathe

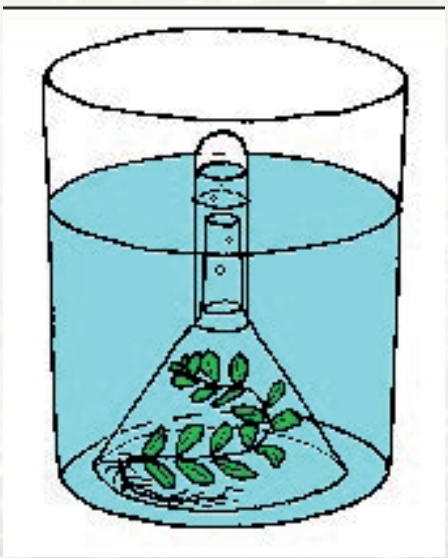
Age of the students 6-12 years

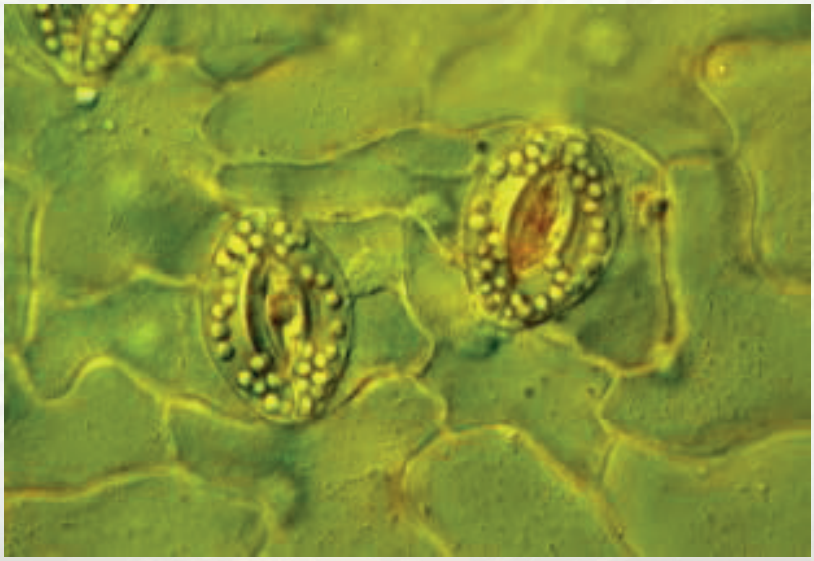
What is needed
- container - flask
- funnel
- test tube
- waterweed (elodea)
- water

What to do Place the sprig of elodea under the overturned funnel, cover the neck of the funnel with a tube.
Place everything in the flask.
Slowly fill the container with water while holding the tube.

What happens Within a few minutes, bubbles (carbon dioxide) will start to form on the elodea leaves.
After a few hours, the amount of air in the tube changes, changing the level of water

Reflexions points Plants breathe, absorb oxygen and produce carbon dioxide.
It is possible to consider changes in conduct by day and by night





BY NC SA

The environnement

The lichens environmental indicators

Age of the students 10-12 years

What is needed
- isolated trees (avoiding conifers if possible)
- wire
- pins

What to do Build a lattice around the whole trunk, about 1 m from the ground, 30 cm in height, divided into 10 x 15 meshes
Detect the frequency of each species of lichens: the frequency can vary from 1 to 10
If it is present with more than one individual in the same rectangle, count only once

What happens Indicate lichens based on colour
Analyse the quality of the area based on the IPA (index table of atmospheric purity)

Reflexions points Lichens, like many other organisms, suffer from the presence of pollutants, particulate matter, fine dust, co2

MEDIA delle frequenze IPA:	COLORE	Livello inquinamento aria	Qualità dell'area
< 0.4	Grigio	Molto elevato	Pessima
0.5<IPA< 1.6	Marrone	Elevato	Scaderte
1.7<IPA<3.7	Rosso	Medio alto	Bassa
3.8 <IPA <6.5	Arancione	Medio	Mediocre
6.6 < IPA < 10	Giallo	Moderato	Discreta
10.1 < IPA < 14.5	Verde	Basso	Buona
IPA > 14.5	blu	Molto basso	Molto buona

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The environnement

Study of a segment of water course, biotic and abiotic factors

Age of the students 8-12 years

What is needed

- geographic maps
- aerial photos
- graph paper
- glossy paper
- tape measure

What to do

Survey of the watercourse on the cartography
Analysis of the hydrographical basin: perimeter of the basin, identification of the watershed, measurement of the surface, dimensions and gradients, slope and relationship with the ability to erode. Observation of the hydro graphic network, traced on gloss, of the type of drainage, length and slope measurements
Survey of pick-up / derivation works

What happens

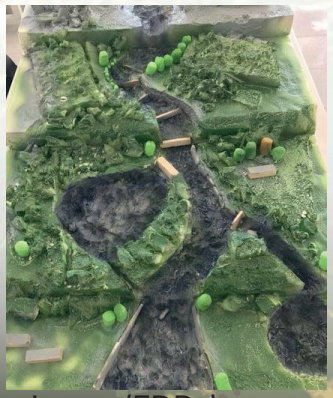
Relief of the exhausts
Size and shape of the pebbles; degree of rounding
Analysis of the geomorphology of the river stretch studied
Relief of erosion forms.
Relief of protection works
Relief of artefacts along the studied stretch of river

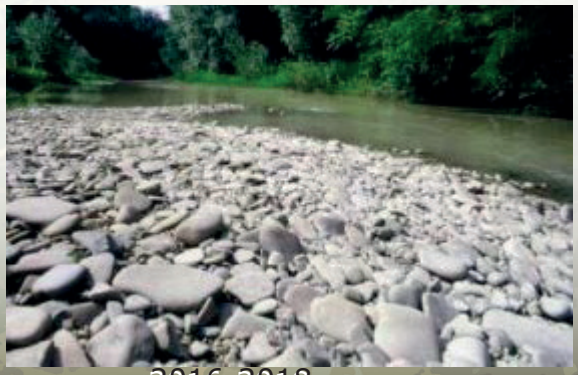
Reflexions points

Physical chemical analysis of water: organoleptic, turbidity, temperature, ph.

The data that can be collected are very numerous.
They can be represented on graphs and tables, with photographs, with
drawings according to the age of the students

There many variables of a stream, abiotic and biotic are strongly linked to each other. Simulations are possible, creating models of different river environments.





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For the Erasmus + project "Parcours TICE: L'EDD dans nos langues"

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Istituzione scolastica Valdigne Mont-Blanc - Morgex - Italia

Texts by Susanna Occhipinti: susanna.occhipinti@unicam.it
The cards are freely drawn from laboratory practices, documentation and CCC images on the
Internet.
Many are taken from the workbooks:
Paramecio, Accacielle, Accadueò and Journey to the Center of the Earth, freely downloadable
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http://www.scuole.vda.it/scienze/index.php/quaderni-di-lavoro

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Graphic realization by
Gianluca Naccarato

Texts supervision
Susanna Occhipinti (Italian)
Maria José Fernandez Anglada (Aranese Occitan)
Estelle Mazodier (Lengadocian Occitan)
Silvia Pillon (English)
Manuela Puleio (French)

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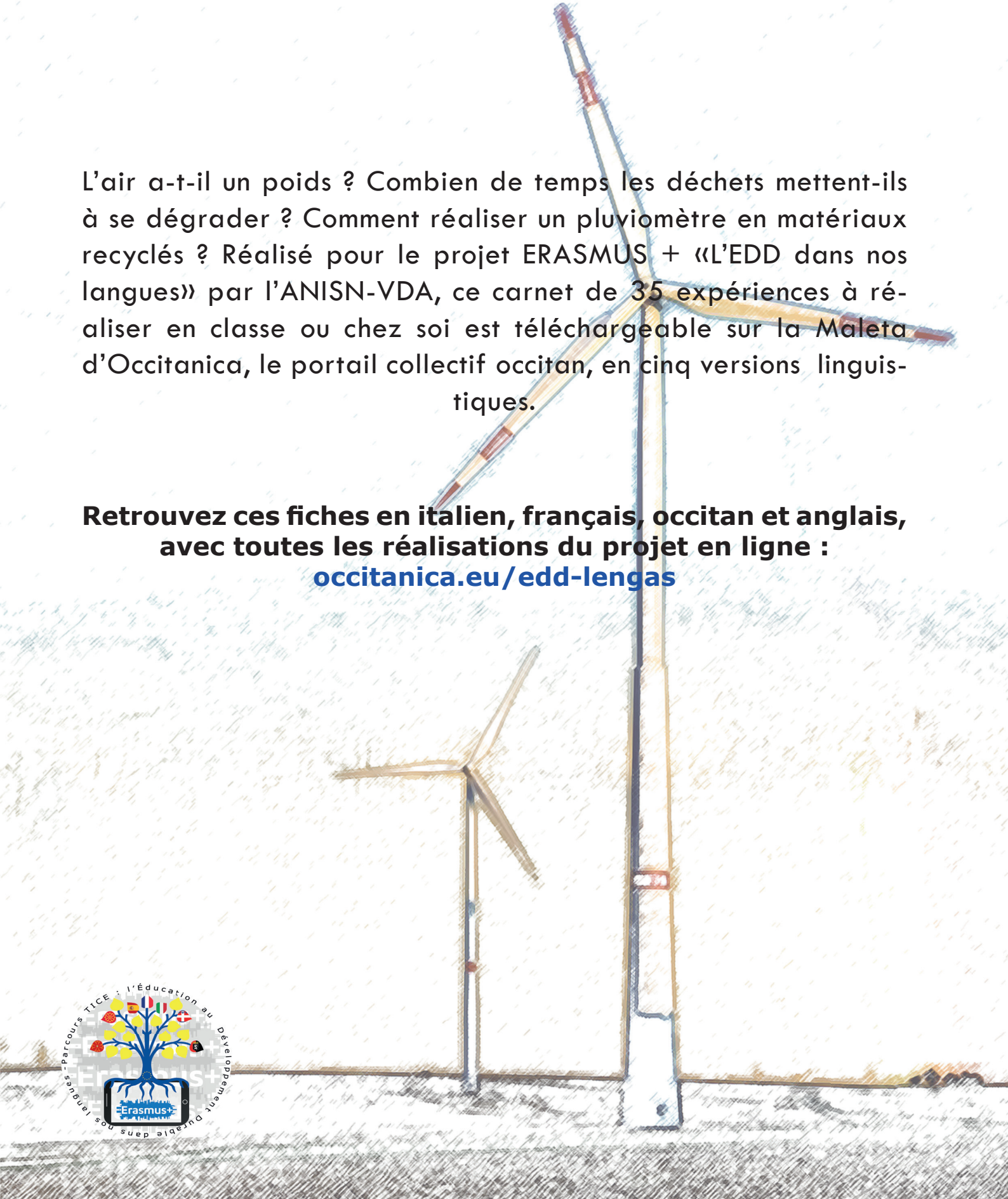
My Book Of Experiments

L'air a-t-il un poids ? Combien de temps les déchets mettent-ils à se dégrader ? Comment réaliser un pluviomètre en matériaux recyclés ? Réalisé pour le projet ERASMUS + «L'EDD dans nos langues» par l'ANISN-VDA, ce carnet de 35 expériences à réaliser en classe ou chez soi est téléchargeable sur la Maleta d'Occitanica, le portail collectif occitan, en cinq versions linguistiques.

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