



"WATER"

experiment book

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ABOUT THE PROJECT

Today's little students have a well-developed imagination that should be used in order to become future scientists. The dynamic of our time current requires innovative learning. We plan to adapt science, which is a highly abstract subject to the preschool curriculum, through play and experiments, not only using definitions and theory, and to apply this knowledge in finding ways to keep the environment clean and healthy. In this project we plan to search information about themes like: earth, air, water, fire and create auxiliary materials such as experiments, experiment books, 'Hook' Stories and puzzles.

By the end of the project, participants will become acquainted with the heritage and culture of other European nations.



PUZZLES



STORIES

III. Theme WATER Experiments

1. Ringing Water *
2. Floating Egg **
3. Water Rainbow ***
4. The Best Way To Transfer Water *
5. Make A Rain Gauge **
6. Mix With Water Or Not? ***
7. The Travel Of The Droplet **
8. What Can The Current Of Water Do **
9. Water And Ice **
10. Floats Or Does It Not Float? *
11. Will It Rain? **
12. With Ice: Hot And Cold Water ***
13. Water Absorption *
14. Walking Water **
15. Water Filtering ***
16. Ice Tower *
17. Ice Fishing *
18. Snow Balls *
19. Rainbow Experiment *
20. Water Cycle Experiment *
21. Nourishing Power Of Water *



"WATER" experiment book

RINGING WATER *

Objectives

-To show children that amount of water in the glass affects the sound produced.

Materials

- A tray with various glasses, -Sticks
- Bowl with water, - Measuring cups,
- Fishing Rods with a string
- The end of which a plastic ball is fixed

Instructions

- 1-There are two glasses in front of the children.
- 2-Children fill them with water, to the middle.
- 3-How to make glasses sound? (children offer various options (tap the glass with a finger, objects which will be offered by children).
- 4-How to make the sound louder?
To propose stick with a ball at the end. Everyone listens the sound from the glasses of water. Do we hear the same sounds?
- 5-Then the teacher pours and adds water to the glasses.
- 6- Check the sound of glasses.

Conclusions

-Each of the glasses will have a different tone when hit with the pencil, the glass with the most water will have the lowest tone while the glass with the least water will have the highest.
- Small vibrations are made when you hit the glass, this creates sound waves which travel through the water.
- More water means slower vibrations and a deeper tone.

Scientific Explication

(What influences the ringing?)
-The different amount of water affects the different ringing, the sounds are different.
(Children try to make a melody.)



Source:

<http://www.sciencekids.co.nz/experiments/makemusic.html>



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FLOATING EGG **

Objectives

-To prove that salt water has a density greater than ordinary water.

Materials

- 2 eggs,
- 2 glasses / vessel with water,
- Carse salt,
- A tablespoon.

Instructions

- 1-Fill one of the drinking glasses almost to the top with plain tap water.
- 2-Gently drop one of the eggs into the water-filled glass. It sinks right to the bottom!
- 3-Fill the second drinking glass half-full with water.
- 4-Add four tablespoons of table salt to the water, and stir.
- 5-Fill the rest of the cup with water, almost to the top.
- 6-Gently place the second egg into the salt water solution...
it floats!

Conclusions

- The egg floats on the surface of the salty water; and sinks / sinks in plain water.

Scientific Explication

- The density of liquid substances is explained by comparing salt water with jelly, where the consistency is much thicker, and hece the density will be higher.
- The density of water is increased with salt and therefore it is more difficult to drown in salt water.





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WATER RAINBOW ***

Objectives

-To show experimentally that water transmits light and refracts it, creating a color spectrum.

Materials

-A container filled with water, a flashlight
-Sunbeams from a window; mirror, sheet of white paper
-Wall section.

Instructions

- 1-Pour water into the tank
- 2-A mirror is placed at the bottom of the tank at a slight angle.
- 3-Catch the sunbeam with a mirror and point the wall or the light from the flashlight is directed to the mirror.
- 4-Rotate the mirror until you see a spectrum of light on the wall.
- 5-Light from it must be caught on the paper / wall.
- 6-Result: a rainbow / color spectrum will be visible on the paper / wall.

Conclusions

-The role of the prism, which decomposes light into its components, is performed by water

Scientific Explication

-Light is the source of color. There are no paints and markers to paint water, a sheet or a flashlight, but suddenly a rainbow appears. This is a range of colors.





THE BEST WAY TO TRANSFER WATER *

"WATER" experiment book

Objectives

- Discover and use various containers.
- To note the different uses according to the characteristics of the containers
- Describe actions: fill, empty, transfer, overflow, sink

Materials

- Hole containers (funnels, sieves, perforated plastic bottles, hose) - Bassine, - Pitcher
- Containers with spout: test tubes, dosing glasses
- Hollow objects: spoons, shovels, watering cans

Instructions

- 1- Discover the objects
- 2- Rules: take only one object at a time, use the objects over the basin
- 3- Sort the objects according to the observations (the objects in which the water remains, the objects from which the water escapes)
- 4- How to fill a pitcher as quickly as possible
- 5-Choosing the most efficient container for transferring water
- 6- Challenge: what tools to fill a bottle

Conclusions

- Appropriate objects and observe what happens when we fill them

Scientific Explication

- Transfer skillfully by adapting to the utensil
- Control your movements
- Think about the best utensils to use



Source

This experience is taken from the book: Estelle Blanquet



"WATER" experiment book

Instructions

- 1-Cut the top of a plastic bottle into a funnel.
- 2-Turn it over and insert it into the bottle
- 3-Lift the bottom of the bottle with small pebbles taking care not to exceed the zero level.
- 4-Decorate the bottle
- 5-Insert some rocks inside the rain gauge under the level
- 6-Put your rain gauge in a shady place, sheltered from the wind so as not to distort the results.

Objectives

- To discover an object of meteorology,
- To discover the technical world,
- To observe physical phenomena
- To design and use an instrument for measuring precipitation.
- To select and test materials suitable for a task.

Conclusions

- Build a technical object

Scientific Explication

- Make a technical object and become aware of its technical performance
- We can measure physical phenomena; the amount of rain water that falls every day and make compariosns.

Materials

- A plastic bottle
- A plastic film
- Some rocks





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Instructions

- 1-Take a transparent bowl
- 2-Put an ingredient in the bowl (each child tests a different ingredient)
- 3-Add water
- 4-Mix
- 5-Observe
- 6-Classify ingredients based on observations

Conclusions

- To be able to recognize, classify, designate materials and qualities of them

MIX WITH WATER OR NOT? ***

Objectives

- Explore the world of matter
- Observe liquids to make people aware of the notion of mixing
- Propose and experiment different mixtures with water and products of house
- Observe and classify the results into two categories, products that can mix and those that do not mix
- Acquisition of a specific vocabulary: mix, dissolve, solve.

Scientific Explication

- Conducting activities involving mixtures, dissolutions, mechanical transformations or under the effect of heat or cold, and approaching some properties and possible transformation of materials and materials themselves.
- Discuss, classify, label and define these properties and transformations using appropriate vocabulary.
- The intensity of the color of the mixture varies according to the proportions (water + syrup, water + paint ...).
- The duration of dissolution is more or less long.
- Address the concept of safety in the face of a transparent liquid (which can be a harmful mixture)

Materials

- A pitcher with a liter of water
- A transparent bowl per child
- 100 g of Sugar & Salt & Flour
- One spoon per child
- Sand
- Coffee,
- Mint sirup, - Oil,





“WATER” experiment book

THE TRAVEL OF THE DROPLET **

Objectives

- To show how water changes to water vapour.

Materials

- Teapot, plastic sheet, a space which could be covered, plants.

Instructions

- 1- Cover the space in which the plants are in.
- 2- Use the plastic sheet to cover the space.
- 3- Turn on the teapot and boil for about 10-15 minutes.
- 4- Turn off the teapot and wait until it cools.
- 5- By looking up, we will see the droplets of water hanging.
- 6- A few minutes, the drops begin to fall. Watch as the drops fall.

Conclusions

- The condensation process starts when the temperature cools. Then the state of water changes. When the temperature rises, the water turns into steam, and when temperature decreases it turns into the water again.

Scientific Explication

- The water vapour turns into water droplets. This is called the condensation process.





WHAT CAN THE CURRENT OF WATER DO? **

"WATER" experiment book

Objectives

- Observe how artificially formed water current can push out the water faster.

Materials

- Two bottles of the same size and capacity, empty container.

Instructions

- 1- Fill in bottles with the same amount of water.
- 2- Flip both bottles at the same time.
- 3- Roll one bottle in circular motions.
- 4- Monitor which bottle of water runs out faster.

Conclusions

- The faster we move the water, the faster water streams move and the stronger the water vortex will be. This will have a stronger vortex force. Therefore, water from the bottle, in which the force of the vortex is formed, runs out of water faster.

Scientific Explication

- Moving water generates the water current that form a vortex of water. The vortex accelerates the flow of water.





“WATER” experiment book

WATER AND ICE **

Objectives

- Observe if the changing the state of water changes the location of items placed in the water.

Materials

- Various things (stones, dried plants, plastic beads, paper, etc.),
- Containers,
- Water

Instructions

- 1- Put different things in a bowl.
- 2- Pour some water over them.
- 3- Observe that some objects float on the surface of the water, while others immediately drown on the bottom.
- 4- Place the mosaic in a freezer to freeze it. After a day observe if all items are in the same positions

Conclusions

- Things that are light (not dense) float to the surface. And those who are heavy (dense) immediately drown. Things such as paper drowns when impregnated. The state of things remains the same, regardless of whether it is in water or ice.

Scientific Explication

- Lightweight items are pushed by the to the surface.
- Heavy things are denser than water. Therefore, they are drowning.





"WATER" experiment book

FLOATS OR DOES IT NOT FLOAT? *

Objectives

- Predict the behavior of different objects in water (buoyancy / sinking)
- Check the behavior of different objects in the water (buoyancy / sinking)

Materials

- A bottom container with water (about 25 cm deep)
- Nails, - Colored pencils - Pieces of lego
- Markers, - Plastic plate, - Grinding wheel,
- Hair clips, - Eraser, - Coins, - Cork stoppers

Instructions

- 1-Ask the children what will happen when you put each of the different objects in the container with water: all sink; they all float; - some float others sink?
- 2-Allow children to observe and experiment on what actually happens
- 3-Placing each of the objects in the container with water and ask them to state their observations in each case.
- 4-Questioning the children about the reasons for the floating of objects and the sinking of others.

Scientific Explication

-When an object is introduced into a liquid, it is subjected to a vertical force, from the bottom up, called the thrust. The intensity of the thrust force is equal to the weight of the volume of liquid displaced by the object. If the weight of the displaced liquid is equal to the weight of the object, it will float.

-The fluctuation of an object depends on its density and on the liquid in which it is introduced. An object floats if its density is equal to or less than that of the liquid into which it is introduced.

-When an object has a value density equal to that of the liquid, it floats.

-When the density of the object is higher than that of the liquid, it sinks.

-When the density of the object is less than that of the liquid, the inverse situation occurs, the object floats.





"WATER" experiment book

WILL IT RAIN? **

Objectives

-Demonstrate how a pinecone closes up with humidity and opens up with heat.

Materials

- 2 pinecones
- Transparent container
- Water

Instructions

- 1-In the morning you put water in a transparent container.
- 2-After that, you put the pinecone in the bowl.
- 3-The other pinecone is left out of the water.
- 4-You wait and observe what happens. The pinecone slowly closes up and in the afternoon is completely closed.
- 5-The pinecone which is out of the water continues open.
- 6-You take the pinecone which is in the water out to dry. (The other one, of course is already dry.)
- 7-The next morning, the pinecone is still closed.
- 8-You put the wet pinecone on a heater, and in the afternoon the pinecone opens up again.

Scientific Explication

- When it starts to rain, the pinecones close up so the seeds can stay dry. As you can see, if you put a dry pinecone in water, it will close and if you let it dry, it will open up again.
- The pinecone "knows" when it's going to rain, so it closes up when the air is humid and opens when the air is dry. The pinecone works as an hygrometer, a device which measures the humidity in the air. If you are near a pinewood and you want to know what the weather is going to be like, you can use the pinecone. If they are closed, the weather will be humid. If they are open, the day will be warm and hot.





"WATER" experiment book

WITH ICE: HOT AND COLD WATER ***

Objectives

- Allow students to test the variables and compare the results to discover what makes ice melt quicker.

Materials

- Measuring cup
- Cubes of ice
- 2 bottles of transparent glass
- Water
- Microwave

Instructions

- 1-With a measuring cup we place 100 ml of water in two bottles of glass. We put one cup in the microwave to heat up the water.
- 2-Then, without touching the bottle we feel which cup had the hot water. The vapor touches our hand and it was warm.
- 3-The teacher picks up the cups: one with cold water and the other with hot water and she pours them on each cube of ice at the same time.
- 4-We observe that the ice which took the hot water melted immediately.

Scientific Explication

- The higher the temperature a material is submitted to, the more energy is transferred to it (transference of energy in the form of heat).
- The energy is then used in the fusion of material. As not all fragments of the material melt at the same time, if we have more energy, the faster this process is.





"WATER" experiment book

Instructions

- 1-Add a few drops of food colouring to some water.
- 2-Stack a few sugar cubes onto each other. Between some cubes put paper towel, cling film or don't put anything.
- 3-Pour the coloured water onto the plate. The coloured water will move up the stack of cubes and eventually make them collapse.
- 4-Does adding paper towel or cling film stop the water reaching the top cubes? Which stack falls down first?

Objectives

- To follow the instructions in order to conduct the experiment correctly;
- To observe how water travels through permeable or impermeable materials;
- To learn about the solubility of sugar;
- To test the optimal conditions required for water to move.

Conclusions

- Children notice the solubility of sugar cubes by observing how coloured water travels through and melts it. They also observe that some materials are permeable (they let water pass through them) and that some materials are impermeable (they don't let water pass through them).

Scientific Explication

- The water is absorbed by the sugar cubes as you can see by the colour rising up through the cubes. The paper towel absorbed the water easily and let it reach the cubes above.
- This is because paper is porous and lets water pass through it. The cling film prevents water passing through. It stopped the flow of water for a while, but eventually it found a way through. These were the last stacks to fall though.

Materials

- Sugar cubes,
- Water,
- Cling film,
- Plate,
- Food colouring,
- Paper towel





"WATER" experiment book

Objectives

- To follow the instructions in order to conduct the experiment correctly;
- To learn about gravity and capillary action (capillarity);
- To learn more about how to obtain secondary colours by mixing primary colours.

Conclusions

- The water is able to move upward against gravity because of the attractive forces between the water and the fibres in the paper towel.

Scientific Explication

- The water travels up the kitchen roll by a process called capillary action. The paper towel is made from fibres and the water is able to travel through the gaps in the fibres. The gaps in the paper towel act like capillary tubes and pull the water upward.
- The water moves against gravity along the tiny gaps within the fibres of the kitchen roll. This process is what helps water climb from a plant's roots to the leaves at the top of the plant or tree.

Instructions

1-Pour water into 6 transparent plastic cups and group 3 together. With pipettes, add food colouring into the cups as follows: 2 red cups, 2 yellow cups and 2 blue cups. Add one empty cup between two cups with primary colours. Cut a piece of paper napkin and fold. Using the folded napkin, join each primary colour cup with the empty cup in the middle. The napkin is placed so that it touches one end of the coloured water and the other touches the empty cup.

2-Wait a few minutes and see the coloured water begin to soak the napkin and climb. When the water reached between the two cups you notice that it begins to descend into the middle cup. To speed up the process, you can place the coloured water cups on a toy or an object, so they are higher than the empty ones.

3-Children can predict: how long it takes to fill the middle cup or the colour resulting from the blend of primary colours. If the process occurs faster if you wet the paper towel first? If it would this work if you used a more viscous liquid, vegetable oil for example or what happens if you use a thicker paper towel?

Source <https://funlearningforkids.com/rainbow-walking-water-science-experiment-kids/>

WALKING WATER **

Materials

- Clear plastic cups (9), - Water, - Pipettes,
- Paper towel, - Food colouring (red, yellow, blue),
- Optional tray and toy to elevate the glasses





"WATER" experiment book

WATER FILTERING ***

Objectives

- To follow the instructions in order to conduct the experiment correctly;
- To learn about water pollution;
- To learn how to clean / filter water.

Materials

- Clear water, dirt, small bucket, clear empty bottle with the top cut off (or clear bottle and funnel),
- Plastic coffee filter, paper coffee filter, paper towel.

Instructions

- 1- Pour the dirt in the bucket and add the clear water.
- 2- Pour the water in the empty bottle so you can see how dirty it is.
- 3- Place your paper coffee filter and paper towel into the plastic coffee filter and pour the water through slowly.
- 4- The water that pours in the bottle is cleaner as the solids are trapped by the filter.

Scientific Explication

- You can see a difference in the water before and after!
- The filter collects all the dirt and particles in it making the water much cleaner. There are many ways you could construct this investigation.
- You could try just one filter and talk about how it traps the big bits of mud and dirt, but smaller particles pass through, or you could compare 2 or 3 different types of filters to see what happens.
- Is kitchen roll better than a coffee filter, would just a sieve work?
- Also, try dirtying the water with different things like oil, soda, food colouring, etc. and see what filter is needed to clean it.

Conclusions

- Children learn more about how to remove residue and dirt from water and also how to protect the environment by reducing water pollution.





"WATER" experiment book

ICE TOWER *

Objectives

- To know the materials provided by the educators;
- To follow the steps towards completion of the experiment;
- To draw conclusions from the experiment.

Materials

- An ice cube,
- A plate,
- A bottle of water

Instructions

- 1- Put an ice cube on a plate.
- 2- Pour water slowly over the ice cube after the bottle has been in the freezer for 3 hours.
- 3- Cold water will freeze and take the shape of a tower.

Conclusions

- The water kept in the freezer to the frost level, in contact with the ice, will freeze.

Scientific Explication

- Liquid water is a network of water molecules, poorly associated with each other, through an intermolecular bonding type called hydrogen bonding. When it freezes, water can form 16 different types of ice crystals.
- Changing the water structure controls the level of ice formation. An "intermediate ice" is first created, the structure of which lies between that of ice and that of liquids.





"WATER" experiment book

Instructions

- 1- Put an ice cube in the water bowl.
- 2- Put the twine in the water with one end on the cube and the other outside.
- 3- Pour a little salt on the ice cube and wait for 5-10 minutes.
- 4- Then grab the other end of the thread and pull the cube out.

Objectives

- To know the materials provided by the educators;
- To follow the steps towards completion of the experiment
- To draw conclusions from the experiment.

Conclusions

- When the salt touches the cube it warms up a little. In 5-10 minutes the salt dissolves in water, combining ice and twine.

Scientific Explication

- When you put the ice cube into the glass, two processes are produced at the same time: ice starts to melt in water and water starts to freeze. Because the two processes are happening in the same time, we can say that ice and water are in balance from the balance.
- In this case, the freezing rate and melting rate is the same.

Materials

- A bowl of water,
- Some ice cubes,
- Salt - Twine





"WATER" experiment book

Instructions

- 1-Cut a pampers, extract the bilberries inside it and put them in a bowl; added water.
- 2-In a few seconds, the beads fill with water, grow and forms the snow.

Objectives

- To know the materials provided by the educators;
- To follow the steps towards completion of the experiment
- To draw conclusions from the experiment.

Conclusions

- Balls in contact with a liquid form a solid layer.

Scientific Explication

- By contact with water, the special beads inside the pampers form a solid layer, called snow, to avoid leaving the wet surface.

SNOW BALLS ***

Materials

- A pampers,
- A glass bowl
- A scissors,
- A cup of water.





"WATER" experiment book

CANDY RAINBOW *

Objectives

- Observing the effect of hot water on colors (dissolving in the water)

Materials

- Colorful candies
- Hot Water
- Flat plate

Instructions

- 1-Align the candies on the plate in a round shape
- 2-Pour hot water into the plate
- 3-Observe the colors dissolving in the water.

Conclusions

- In this experiment, the dissolving effect of hot water on colors can be observed.
- With hot water, colors mix easily. But colors do not melt or get mixed in cold water.

Scientific Explication

- Although the liquid is the same, when the heat of the liquid changes, the density also changes. As the heat increases, the density of water decreases. There are some differences between hot water and cold water. One of these differences is the effect of water on melting the colors. Cold water does not make the colors dissolved. This is why hot water is used for washing. Hot water can remove stains easily.





"WATER" experiment book

WATER CYCLE EXPERIMENT *

Objectives

- Observing the formation of rain

Materials

- Zip lock plastic bag
- Acetate (permanent) pen
- Water
- Blue food coloring
- Tape

Instructions

- 1-Draw clouds and sun on the zip lock bag
- 2-Draw sea line under the bag
- 3-Mix the water and the blue food coloring
- 4-Put the blue water into the bag and close it
- 5-Stick the locked bag on a sunny window
- 6-Observe the formation of rain

Conclusions

- In a couple of days, It can be observed that water evaporates in sunlight, steam becomes water again by condensation, and it falls into the sea as rain.

Scientific Explication

- Water resources such as seas, rivers, lakes and underground sources; can move or change but never increase or decrease. Amount of water resources that is used by plants, animals or humans may decrease but it comes to the same level again with rainfall.
- In the real water cycle, water come back to earth as rain, snow or hail. And these waters can increase the water level of sea and lakes as well as underground waters.





"WATER" experiment book

NOURISHING POWER OF WATER *

Objectives

-Observing the nourishing power of water

Materials

- Two tall and same sized glasses
- Two flowers which are exactly the same

Instructions

- 1-Put same amount of water into the glasses
- 2-Place the flowers into the glasses
- 3-Change the water of one of them every day, and do not touch the other one
- 4-Wait for 3-4 days, view the situation of the flowers
- 5-Examine the health of both flowers

Conclusions

-Observe that the flower with changed water is more healthy and the other one starts to fade

Scientific Explication

-Water dissolves the fertilizer and carries it to the roots of the flower. When plants absorb the water, they also get the fertilizer. Plants lose water as well as humans and the other living creatures. And if they do not gain it back, they get dehydrated and die. That is why water is so important for plants.



SMALL SCIENTISTS ACROSS EUROPE



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This book is a result of Erasmus+ project as 'Small Scientists Across Europe'

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