

SCRUMPALICIOUS!

**SWEET
SHOP**

IT'S A WONDERFUL WORLD...



SUPER LAB CHOCOLATES

**MAKE FANTASTIC
CHOCOLATE LOLLIPOPS,
CRISPY SWEETS AND HOMEMADE
CHOCOLATE ICE CREAM!**





AVAILABLE ONLINE: FI DK NO SE CZ

www.hamleys.com/explore-SuperSciencelabkits.irs

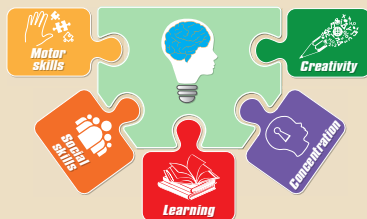
Dear parents and guardians

Through play, children develop different cognitive skills. Scientific studies show that when we are having fun or making discoveries during an experiment, a neurotransmitter called Dopamine is released.

Dopamine is known to be responsible for feelings like motivation, reward and learning and that's why experiences are related to positive feelings. So, if learning is a positive experience, it will stimulate the brain to develop various skills.

Therefore, Science4you aims to develop educational toys that combine fun with education by fostering curiosity and experimentation.

Find out below which skills can be developed with the help of this educational toy!



The educational feature is one of the key strengths of our toys. We aim to provide toys which enable children's development of physical, emotional and social skills.

Find out more about the Brain Activator in Science4you toys at:

www.science4youtoys.co.uk/brain-activator



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This book was produced in accordance with the following key stages and curriculum goals of subjects:

- Science: KS1; KS2;
- Chemistry: KS3.

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SAFETY RULES

- Read these instructions before use, follow them and keep them for reference.
- Keep young children and animals away from the experimental area.
- Store this experimental set out of reach of children under 8 years of age.
- Clean all equipment after use.
- Make sure that all containers are fully closed and properly stored after use.
- Ensure that all empty containers and/or non-reclosable packaging are disposed of properly.
- Wash hands before and after carrying out activities.
- Do not use any equipment which has not been supplied with the set or recommended in the instructions for use.
- Do not smoke in the cooking area.
- Do not replace foodstuffs in original container. Dispose of immediately.
- Make sure the tools are properly clean before you start preparing food.
- Take care while handling with hot water and hot solutions.
- Use only food contact materials in order to develop the recipes and to store the prepared foods.
- All the preparation stages included in the recipes which require the use of the oven, stove, household appliances and knives, should be performed by an adult.
- If you spill any liquid, blot it up immediately in order to avoid slipping.
- Avoid any contact of the ingredients with the eyes.
- Surfaces, liquids and tools may be very hot.

GENERAL FIRST AID INFORMATION

- **In case of eye contact:** wash out eye with plenty of water, holding eye open if necessary. Seek immediate medical advice.

In case of emergency dial

USA 911 | UK 999 | Australia 000 | Europe 112

ADVICE FOR SUPERVISING ADULTS

- Read and follow these instructions, the safety rules and the first aid information, and keep them for reference.
- **Allergenic products:** this kit has ingredients that contain or may contain gluten, milk and milk-based products (including lactose), nuts and soybeans which can cause allergies (see page 6).
- The non-compliance of the precautions included in this book may expose children to unnecessary dangers.
- This experimental set is for use only by children over 8 years.
- Because children's abilities vary so much, even within age groups, supervising adults should exercise discretion as to which experiments are suitable and safe for them. The instructions should enable supervisors to assess any experiment to establish its suitability for a particular child.
- The supervising adult should discuss the warnings and safety information with the child or children before commencing the experiments. Particular attention should be paid to the safe handling of acids, alkalis and flammable liquids.
- The area surrounding the experiment should be kept clear of any obstructions and away from the storage of food. It should be well lit and ventilated and close to a water supply. A solid table with a heat resistant top should be provided.

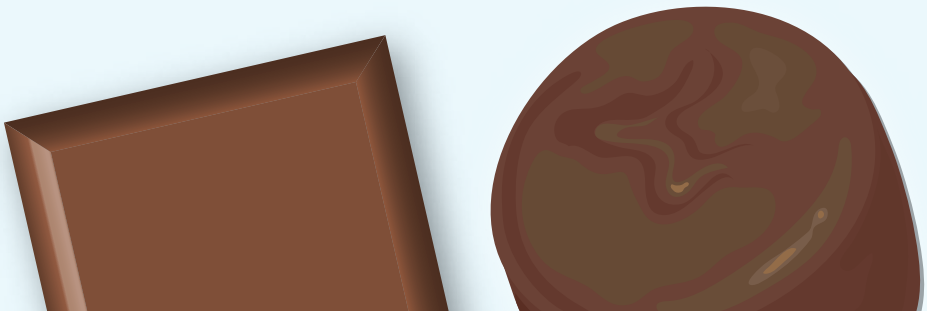
KIT CONTENTS



Description:

Quantity:

1. Aluminium moulds for cakes ,	3
2. Silicone mould for sweets ,	1
3. Coloured aluminium foil ,	1
4. Lollipop mould ,	1
5. Decorative stickers ,	1
6. Cards for painting with chocolate ,	2
7. Sachet with sprinkles ,	1
8. Thermometer ,	1
9. Silicone spatula ,	1
10. Lollipop sticks ,	5
11. Sachet of powder chocolate ,	1





INGREDIENTS LIST

Powder chocolate

Ingredients: sugar, cocoa powder (32% minimum) and flavouring (vanillin).

Sprinkles

Ingredients: Sugar, maize starch, maltodextrin, coating agent (E903) and coloring (E100, E120, E133, E171). **May contain gluten, soybeans, milk and nuts.**

Throughout the book included in the kit, the use of substances or products that can cause food allergies or intolerances, such as nuts; cereals containing gluten and products thereof; eggs and products thereof; and milk and products thereof, may be suggested.



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+ Curiosities

Do you want to learn more about chocolates?

Become a real scientist and discover the curiosities we have for you at the following link:

www.science4youtoys.co.uk/super-lab-chocolates



Material included in the kit.

1. Experiments

Before you begin



Homemade piping bag

The piping bag is one of the most important tools of a chocolatier!

Make your own, so that you can use it in the delicious experiments we have for you!

ATTENTION: ask an adult for help.

What you will need:

- Baking paper
- Scissors
- Pencil
- Sticky tape

Steps:

1. Put together the upper right corner of the baking paper with its base, such as shown in the image.



2. With a scissors, cut along the crease to make a triangle.



3. With the help of a pencil, transform the triangle into a kind of cone.



4. Roll the baking paper such as shown in the image.



5. Roll out the endings of the baking paper. Put sticky tape on the endings, so that the cone doesn't open while you are using it.



Finally, when you want to use your piping bag, cut out its tip.

Tip: do not cut the tip of the piping bag too much, otherwise when you fill the bag with chocolate, it will spill out.

Now that the piping bag is ready, let's start!

Note: you can also make a piping bag with freezer bags. You only have to cut one of the bag's corners! Do not cut it too much, a small hole is enough!



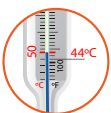
SUPER LAB CHOCOLATES



1.1. The Chocolate Lab

Before performing the experiments, you must wash thoroughly all the materials.

Scientist, learn how to use your thermometer! Until 50°C (122.0°F) the scale of your thermometer is from 10 to 10, so if you want temperatures like 44°C (111.2°F) or 25°C (77.0°F), you only need to divide each interval in half.



Experiment 1

Make shapes out of chocolate

ATTENTION: ask an adult for help.

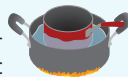
What you will need:

- Silicone mould for sweets 🍪
- Thermometer 🌡️
- Saucepan
- Metallic bowl or small saucepan that fits in the other saucepan
- Piping bag
- Silicone spatula 🥄
- Kitchen knife
- Water
- Sachet of chocolate powder 📦
- Chocolate bar (100 g)
- Milk
- Tablespoon
- Coloured aluminium foil 📦
- Decorative stickers 🍪
- Toothpick

Note: the quantities indicated in this experiment are enough to fill your silicone mould for sweets. However, if you do not want to make all the sweets at once, divide the quantities in half, such as scientists do! You can also use the chocolate, liquid, in experiments 2 and 4 and in recipes 1 and 8.

Steps:

1. Pour some water into a saucepan and then place a metallic bowl or smaller saucepan in it, such as shown in the image. Ask an adult to put the saucepan to heat.



This technique is known as water-bath. It gives heat to the chocolate, slowly and consistently. Due to the water boiling point, the metallic container is heated and this heat is transferred to the chocolate.

DID YOU KNOW...

That the water-bath method is also used in labs and industrial processes?



2. Ask an adult to cut the chocolate bar in tiny pieces, using a kitchen knife.



3. Place $\frac{2}{3}$ of the pieces of chocolate in the saucepan. Add all the sachet of chocolate powder and 6 tablespoons of milk. Stir well with the silicone spatula.



Note: melt the chocolate in low heat. The water used for the water-bath must only boil and you must never add it to the chocolate bowl!

4. Such as a real scientist, use the thermometer to control the temperature! Try to melt all the chocolate before it reaches 44°C (111.2°F)!

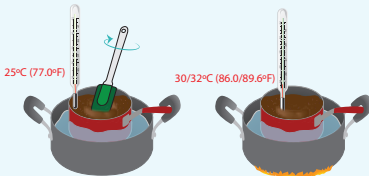


Attention Scientist! In cooking and laboratory, temperature is very important, any change not expected can influence the success of your experiment!

5. Before reaching 40/44°C (104.0/111.2°F), turn off the stove and remove the saucepan from the heat source. Now, add the rest of the pieces of chocolate you cut in step 2.



6. Keep stirring the chocolate with the silicone spatula, until it is completely melted. When the chocolate cools down until reaching room temperature, about 20/25°C (68.0/77.0°F), turn on the stove with the help of an adult, and reheat the chocolate until 30/32°C (86.0/89.6°F).



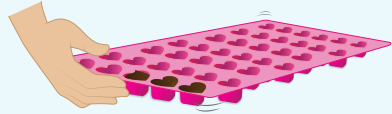
You have just tempered your chocolate!



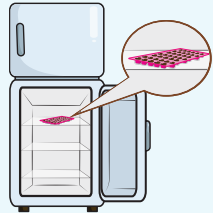
7. Fill your piping bag and carefully fill in the open spaces of the silicone mould for sweets.



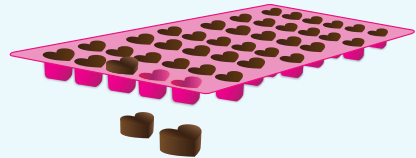
8. In order to evenly distribute the chocolate, touch slowly, for a few times, the sides of the mould. You can also use a toothpick to spread the chocolate along the mould.



9. Leave the chocolate to dry for a few hours, until it becomes solid. In order to fasten this process, you can place the mould in the fridge.



10. When the chocolate is completely solid, remove it carefully from the mould.



11. Finally, wrap your chocolates in coloured aluminium foils and decorate them with stickers.



Scientist, what happened to the chocolate? Which are the physical transformations that you can see here?



Consume within 5 days (store in the fridge).

Explanation:

At room temperature, your chocolate bar is solid. For it to become liquid, you need to heat it. When there is an increase of temperature, it is possible to change the physical state

SUPER LAB CHOCOLATES





of the chocolate, going from solid into liquid. We can only change the shape of chocolate when it is in the liquid state, as it solidifies in the shape of the mould where you've placed it. This way, when the chocolate is at room temperature, its particles (atoms, molecules and ions) are arranged differently!

Experiment 2 Chocolate lollipops

ATTENTION: ask an adult for help.

What you will need:

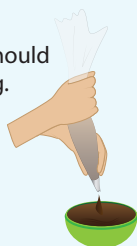
- Material used in experiment 1*
- Lollipop mould 
- Lollipop sticks 

*You will not need the silicone mould for sweets

Steps:

1. Follow steps 1 to 6 from experiment 1, in order to get liquid chocolate.

2. Fill the bottom of a lollipop mould with the help of your piping bag.



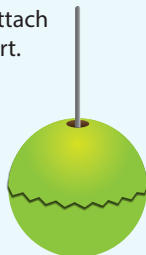
3. Place the upper part of the mould on a plate (**Attention!** The chocolate can spill out through the hole of the mould!). With the help of your piping bag, fill this part with chocolate too.



Note: if you still have liquid chocolate, you can use it in experiment 4 and in recipes 1 and 8.

4. Carefully close the mould. Attach the upper part to the lower part.

5. Place the lollipop stick up-right in the mould's hole.



6. Place the lollipop mould in the fridge and wait until the chocolate is solid. Carefully, remove the lollipop from the mould.

7. Wrap your lollipop in aluminium foil and decorate it with stickers!



 **Consume within 5 days** (store in the fridge).

Scientist, try to make coloured lollipops! Fill each open space with a different chocolate (for example: milk chocolate and white chocolate) and you'll get a two-coloured lollipop!



Tip: you can also make sweets with your lollipop mould! Follow the same steps but do not place the lollipop stick in the mould.







Experiment 3

The melting point of chocolates

There are different types of chocolate: dark, milk, white and many more.

However, not all of them are transformed from the solid state into the liquid state at the same temperature! Let's find out the different temperatures!

What you will need:

- Different types of chocolate (dark, white, milk, and others)
- Plastic plate
- Thermometer 
- Chronometer 



Steps:

1. Place different types of chocolate on a plastic plate in the sun. One at the time, measure and note down their temperature with the thermometer and the time that each type takes to melt, using a chronometer.



What do you conclude? Do they all behave in the same way?

ATTENTION: when you have finished the experiment, throw away all food products used.

Explanation:

The sunlight, or other source of heat, can melt your chocolate! At a certain temperature, the solid chocolate starts transforming into a liquid, this is to say, it melts!

The results of this experiment will highly depend on the chocolates you have used. The melting point of chocolate can be influenced by several factors, including the quality of the cocoa beans, the way they are processed, the

way the chocolate is tempered and by the ingredients used to make it. Even though the melting point is different, you will not see great changes.

Milk chocolate is more sensitive to heat, so it is more likely that it melts faster and at a lower temperature. On the other hand, white chocolate should take longer to melt and should need a higher temperature for it to happen. The temperature and the time a chocolate takes to melt, are related to what it is made of.





Experiment 4

Paint with chocolate

ATTENTION: ask an adult for help.

What you will need:

- Material used in experiment 1*
- Cards for painting with chocolate 
- Transparent cling film
- Sachet with coloured chocolate chips 
- Piping bag

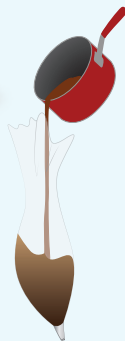
*You will not need the silicone mould for sweets

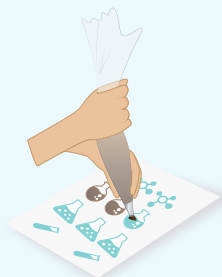
Steps:

1. Follow steps 1 to 6 from experiment 1, in order to get liquid chocolate.
2. With the transparent cling film cover the card with the drawings.



3. Pour the chocolate into the piping bag. If you use a freezer bag, remember not to cut it too much!





4. Outline and paint the drawings of the card with chocolate, with enough chocolate to remove them easier.

You can create your own drawings, using the same technique, by painting them with chocolate, and you can offer them to your family and friends!

Tip: use different types of chocolate so that you can have different colours in your paintings! If you use white chocolate bars, do not add powder chocolate, otherwise you will change the colour of your painting. Scientist, remember to keep checking the temperature of the chocolate, such as you have learnt in experiment 1.

You can also add coloured chocolate chips to your paintings!



5. Wait until the chocolate becomes solid (in order to fasten the process, store it in the fridge). Carefully, remove your chocolate shapes from the cling film.



6. You can also wrap your chocolates and decorate them with the stickers included in your kit.



Consume within 5 days (store in the fridge).

Explanation:


Chocolate in liquid state can be moulded in different ways, before becoming solid. When it becomes solid, it takes the shape of the drawings.



Experiment 5

At what temperature does chocolate melt?

What you will need:

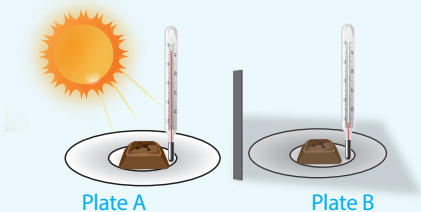
- 3 Pieces of the same chocolate and in the same size
- 2 Plastic plates
- Thermometer 
- Notepad

Steps:

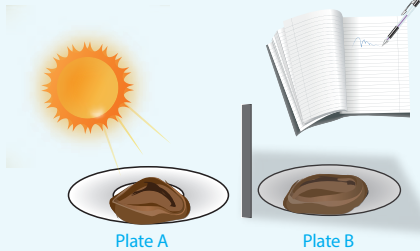
1. Place a piece of chocolate on each plastic plate.



2. On a sunny day, put the plates in different places: one in the sun (plate A) and the other in the shadow (plate B). With the help of the thermometer you can check at what temperature is each chocolate.



3. When the chocolate starts to melt, note down its temperature and the time it takes for each piece of chocolate to melt.



What do you conclude?

Explanation:

The chocolate in your mouth melts very fast! Our body's temperature is of about 37°C (98.6°F), that is why it is possible to melt it that fast.



In which plate did the chocolate melt faster? And why?

Note: if on one of the plates the chocolate doesn't melt at all, change their places and note down what you observe!



Experiment 6

Evaluate chocolate

- Sensory Evaluation



In this experiment transform yourself in a real master of chocolate tasting!

ATTENTION: when you have finished the experiment, throw away all food products used.

Explanation:

At a certain temperature, the chocolate changes its physical state, from solid into liquid, or in a state between these two. On a very hot day, the sunlight is normally enough to melt the chocolate. This way, the chocolate from plate A will melt faster than the chocolate from plate B. Depending on the temperature they are at, it will take more or less time to melt the chocolate. This process is reversible, this is to say, if you put the chocolate in the fridge, it changes back again into solid.

Back to the experiment...

4. Put the third piece of chocolate in your mouth.

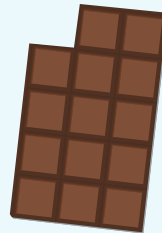
5. Without chewing it, note down the time it takes to melt.

What you will need:

- Different types of chocolate (milk, white, dark), the best would be to have at least 2 types of chocolate, both from different brands
- Notepad

Steps:

1. Put a piece of each type of chocolate in your mouth, one at a time. Also compare the same type of chocolates but with different brands.



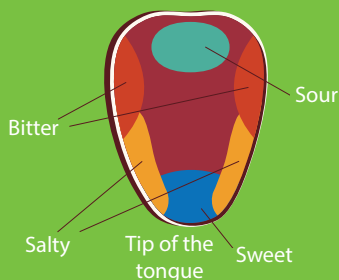
Try putting the pieces of chocolate in different areas of your tongue: first at the back, then on the side and finally on the tip. Did you feel its flavour on all the areas of your tongue?



DID YOU KNOW...

That our tongue can taste 4 different flavours: sweet, salty, sour and bitter?

And each area of our tongue only detects one of these flavours.



Experiment 7 Heat and chocolate

ATTENTION: ask an adult for help.

What you will need:

- Lamp desk
- Porcelain mug
- Metallic fork
- 2 Pieces of chocolate
- Napkin
- Water

Steps:

1. With the help of an adult, put water to heat.
2. Fill a mug with hot water. Dip the metallic fork in the water and then touch it. Is it hot?



Why is the fork hot?



Create the sensory profile of each chocolate, considering:

Flavour - milk, cocoa;

Taste - sweet, bitter;

Texture - melts/does not melt.

Scientist, what can you conclude, in terms of flavour, taste and texture of each chocolate?

SUPER SCIENTIST: our nose is also very important to feel the flavours! Try covering your nose when you eat a piece of chocolate and you'll see that you can't feel its flavour!

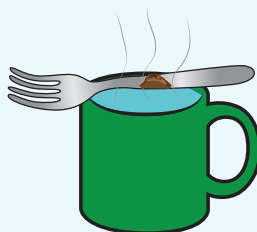
Explanation:

At the end, and only at the end, read the labels of your chocolates and find out the percentage of milk and cocoa that they have.

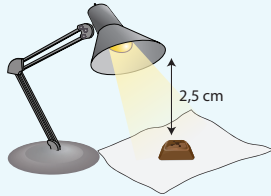
Try relating your results with the information provided in the labels of each chocolate.



What happens to the chocolate?



4. Put the other piece of chocolate on a napkin and place it on a table. Turn on a desk lamp and point the light to the chocolate in a distance of about 2.5 centimetres (cm). Wait a few minutes and then touch the chocolate.



What happens to the piece of chocolate?

Scientist, how was the heat transferred on each step?

ATTENTION: when you have finished the experiment, throw away all food products used.

Explanation:

In step 2 the heat is transferred by conduction. In step 3, the heat is transferred by convection and in step 4 it is transferred by radiation (lamp).

Scientist, heat can be transferred by conduction, convection and radiation!

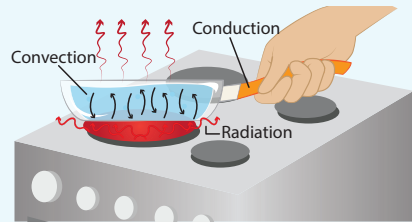
Conduction: in this experiment (step 2), the heat was conducted to the metallic fork because you placed it in hot water. In conduction, the heat is transferred from an area with a higher temperature to another with lower temperature, by the collision of particles (atoms, molecules and ions).

This allows that faster particles, from high temperatures, transmit energy to the slower ones. Metals, for example, are good heat conductors, while wood and plastic are bad conductors.

Convection: in this experiment (step 3) the chocolate started to melt, by convection, due to the hot water vapour from the mug. When liquids and gases are heated, their particles move faster. Convection is a process in which the heat is transferred from a place to another of a liquid, by the movement of the particles of that liquid. The hotter part of the liquid becomes less dense and rises.

Radiation: it is the energy transferred on the form of electromagnetic waves that spreads through space. In this experiment (step 4) the heat was transferred by radiation through the desk lamp. All bodies emit radiation, if they are at a temperature over the room temperature. The higher is that temperature, the higher will be the energy irradiated.

Ways to transfer heat:



Experiment 8 Chocolate comets

ATTENTION: ask an adult for help.

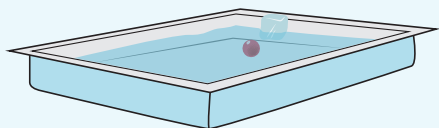
What you will need:

- Transparent glass container
- Warm water
- Ice block or a plastic bag full of ice cubes
- Coloured chocolate dragées (for example, M&Ms)

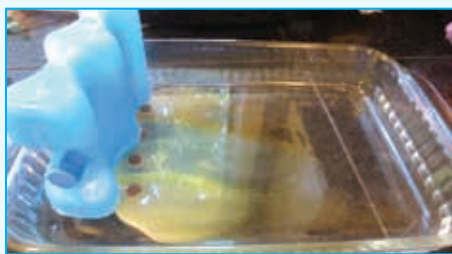


Steps:

1. Fill half the transparent glass container with warm water.
2. Place the block of ice in one of the container's ends.
3. Place the coloured chocolate dragée in the water near the block of ice, such as shown in the image.



Can you see the tail of the comet forming?

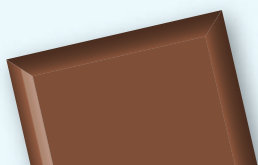


ATTENTION: when you have finished the experiment, throw away all food products used.

Explanation:

The ice block cools down the water around it. Cold water is denser than hot water, so it sinks.

It is this movement of water that allows to spread the dissolved colour of the chocolate dragées, creating a tail of a comet!



Experiment 9 Hollow chocolates

What you will need:

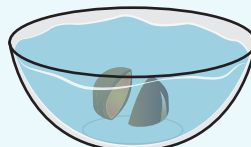
- Chocolate with sugary filling (such as caramel)
- Bowl of water

Steps:

1. Break the chocolate in half, so that you can see the filling.



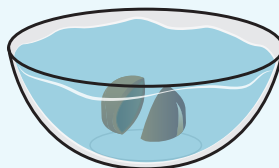
2. Place the chocolate in the bowl of water.



3. Leave the chocolate in the water for several hours.



Has the filling of your chocolate disappeared? Why?



ATTENTION: when you have finished the experiment, throw away all food products used.

Explanation:

Chocolate does not dissolve in water, but sugar does! So, sweets that are made mostly of sugar, like mint filling or caramel, dissolve in water. This is why the inside of the chocolate is left hollow.



Experiment 10

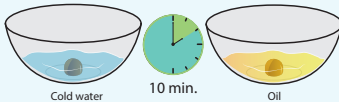
What dissolves chocolate?

What you will need:

- Cold water
- 2 Pieces of the same chocolate
- 2 Small bowls
- Cooking oil
- Tablespoon
- Paper towel

Steps:

1. Pour a little of cold water into a small bowl.
2. Pour 2 tablespoons of cooking oil into another bowl.
3. Place 1 piece of chocolate in each bowl and wait for about 10 minutes.



4. Remove the chocolate from the water.



Do you observe any difference?

5. Remove the chocolate from the oil.



Does it melt on your fingers? Rub it on a paper towel, what do you observe?

ATTENTION: when you have finished the experiment, throw away all food products used.

Explanation:

If you join water and oil, oil will float at the surface of water because oil and water do not get mixed. Oil does not dissolve in water and water does not dissolve in oil. Some things that dissolve in water (like salt) do not dissolve in oil and vice-versa. Chocolate is made of cocoa butter. This butter is a type of fat, or oil, which means it doesn't dissolve in water, but it can be dissolved in cooking oil.



Scientist, mix a little of chocolate powder with cold milk and then with hot milk! Can you dissolve the chocolate powder in both situations? Is it possible that temperature also influences the solubility of chocolate?

Note: save the used oil for other experiments or pour it into an empty plastic bottle, let it cool, make sure the lid is on tight and then throw it in the trash. You can also donate it to designated drop off sites.



Experiment 11

Chocolate bloom

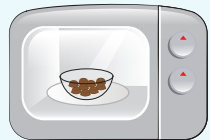
ATTENTION: ask an adult for help.

What you will need:

- Dark chocolate
- Heat source (microwave)
- Heat resistant container

Steps:

1. Put the chocolate in the heat resistant container and place it in the microwave to heat, until it starts to melt.



2. Leave the chocolate to cool. For it to cool faster, place it in the fridge.

3. Place it in the microwave once again and heat it until it starts to melt.

4. Place it in the fridge again.

5. Repeat these steps until you see streaks forming on your chocolate!



Do you know what these streaks are?



ATTENTION: when you have finished the experiment, throw away all food products used.

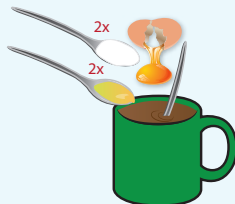
Explanation:

Chocolate is very sensitive to changes in temperature, and that is why, if it is exposed to very high or very low temperatures, its characteristics can change! This happens because when cocoa butter is liquid for a long time, it starts to move up to the surface of the chocolate. This phenomenon is called flat bloom, and causes light spots and streaks on the chocolate's surface. Chocolate also breaks easily and its flavour changes too.

However, you still don't have a cake right? So what is missing?



3. Add 1 egg, 2 spoons of milk and 2 spoons of vegetable oil. Mix it all well using a fork.




4. Place the mug in the microwave, at 600W, for 3 minutes.

Careful, it is hot!



5. Wait until it cools and then delight yourself with the cake!

Scientist, what happened inside the microwave that has transformed your mixture into a cake?

 Consume within 5 days (store in a cool and dry place).

Experiment 12 Cake in a mug

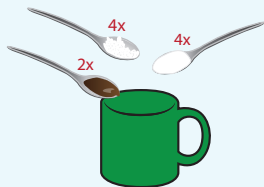
ATTENTION: ask an adult for help.

What you will need:

- Mug
- Tablespoon
- Fork
- Microwave
- 4 Spoons of self-raising flour
- 4 Spoons of sugar
- 2 Spoons of chocolate powder
- 2 Spoons of milk
- 2 Spoons of vegetable oil
- 1 Egg

Steps:

1. Put in a mug 4 spoons of flour, 4 spoons of sugar and 2 spoons of chocolate powder.



2. Stir it all well with a fork and you'll get a brownish mixture.

Explanation:

The flour contains baking powder and an acid, in enough portions to react with one another. However, the flour also contains starch, which is used to keep these ingredients separated and dry, preventing a reaction to happen between them. When we mix the self-rising flour with a liquid containing water, a chemical reaction between the baking soda and the acid happens and new products are created. This reaction

happens faster, with high temperatures. As a result of the reaction, carbon dioxide is created, a gas that is responsible for the millions of bubbles that appear on cakes to make them lighter.

Scientist, mix a little of yeast with cold water and then with hot water. Observe what happens!



Experiment 13 **Chocolate cups with balloons**

ATTENTION: ask an adult for help.

What you will need:

- Baking paper
- Melted chocolate
- Water balloons
- Scissors
- Tray

Steps:

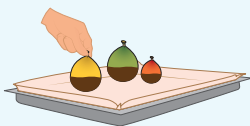
1. Fill the water balloons with air, in the size you want your chocolate cup to be, and line a tray with baking paper.

Tip: if you decide to make a chocolate cup with a big balloon, the chocolate must be warm and not hot, otherwise the balloon can pop.

2. Now, dip the bottom of the balloons in the melted chocolate, such as shown in the image.

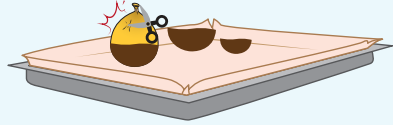


3. Place the balloons covered in chocolate on the tray.




4. Leave the chocolate to cool and place the balloons for 15 minutes in the fridge.

5. When the balloons are solid, pop them with a scissors.



6. Now, you can put the filling you want in your cup.



 Consume within 5 days (store in the fridge).

Note: if you want to make thicker cups, you just have to repeat several times steps 2 to 4, after removing them from the fridge.


Tip: try performing this experiment with aluminium moulds for cakes.



Experiment 14 **Chocolate mousse with water**

ATTENTION: ask an adult for help.

What you will need:

- Chocolate bar with a high % of cocoa (250 grams [g])
- Silicone spatula 
- Saucepan
- Large bowl
- Medium bowl
- Water (200 millilitres [ml])
- Ice
- Mixer



DID YOU KNOW...

That this recipe was created by the French scientist Hervé This?

This scientist researches molecular gastronomy, the science of the cooking phenomena!



Image 1. Hervé This.

Steps:

1. Place the chocolate bar, in small pieces, in a saucepan.



2. Add 200 ml of water.

As it is a reasonable amount of water, you can put the mixture to heat without taking any risks of burning the chocolate.

3. Put the saucepan to heat so that the chocolate can melt and get well mixed with water.



4. Pour the mixture into the medium bowl.

5. Place the ice and a little of water in the large bowl.

6. Place the bowl with the mixture of chocolate inside the container with ice and stir well using the mixer.



7. After 10 minutes the mousse will start forming. When you are almost reaching the right consistency, stop the mixer, because this kind of foam will become a bit more thick.

8. Your mousse is ready, with a creamy consistency! Store it in the fridge and delight yourself later!



Note: if the mousse is mixed too much, it becomes grainy. If this happens, put it in the saucepan to heat and start over again.



Consume within 3 days (store in the fridge).

Explanation:

You have just created an emulsion. Emulsions and foams are examples of colloidal dispersions used in cooking. A colloidal dispersion is a mixture of small insoluble particles that are evenly dispersed in a continuous medium. The particles are called **dispersion phase**. The colloidal mixtures are classified according to the state (gas, liquid or solid) of the particles and of the continuous medium. Foam, for example, is a dispersion of the gaseous bubbles in a liquid.

In this experiment, the container with ice helps to control the temperature of your chocolate mousse. When we lower the temperature of the mixture, we are turning the cocoa butter of the chocolate into a solid, which allows to stabilise the foam.

Colloidal dispersions in the kitchen



Colloidal dispersions in the kitchen

Mixture	Dispersion phase/ medium	Example
Emulsion	Liquid/liquid	Mayonnaise
Liquid foam	Gas/liquid	Chantilly
Solid foam	Gas/solid	Bread
Gel	Liquid/solid	Jelly

Mixtures can be homogeneous, heterogeneous or colloidal. A homogeneous mixture can also be called solution. In a homogeneous mixture we can't distinguish the different components, while in a heterogeneous mixture we can. In a colloidal mixture we can't distinguish with the naked eye the components, however, when we observe under a microscope it is possible to make that distinction.



1.2. The Recipes of the Scientist



Recipe 1 Chocolate fondue



ATTENTION: ask an adult for help.

What you will need:

- Different types of chocolate
- Different cookies
- Fruit: strawberry, banana, kiwi and others
- Sachet with sprinkles
- Material used in experiment 1*

*You will not need the silicone mould for sweets

Steps:

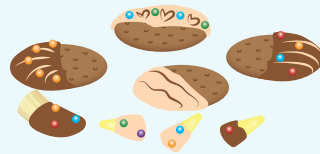
1. Follow steps 1 to 6 from experiment 1, in order to get liquid chocolate.

2. Dip the cookies in the chocolate. You can cover them with white chocolate topping

and decorate them with milk chocolate, or vice-versa!



3. Decorate your cookies with the sprinkles.



4. Wait that chocolate gets solid and you may offer these cookies to your friends!



Consume within 5 days (store in a cool and dry place).

5. Repeat the procedure, but now use the fruits you like the most.



Consume immediately.

Fondue is a Swiss dish. This recipe is normally a mixture of several cheeses, heated with a candle or spirit lamp (or other heat source), and from where we serve ourselves directly! We dip bread, potatoes and carrots in the cheese with a special fork. There is also a fondue of caramel or chocolate that is an adaptation of the original fondue.



Image 2. Cheese fondue.




Recipe 2

Cookies with chocolate chips

ATTENTION: ask an adult for help.

What you will need:

- Melted butter (200 g)
- Sugar (200 g)
- 3 Eggs
- Flour (500 g)
- 1 Teaspoon of yeast
- 2 Tablespoons of chocolate powder
- ½ Bar of cooking chocolate
- Large bowl
- Silicone spatula 
- Oven tray
- Baking paper

Steps:

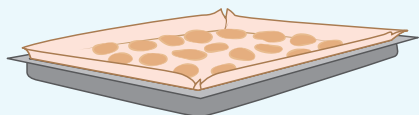
1. In the large bowl, whisk the eggs, butter and sugar.

2. Add the powder chocolate and mix it all once again.

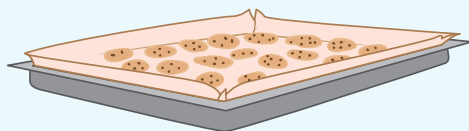
3. Little by little, add flour and yeast.

4. Line the oven tray with baking paper.

5. Make small balls with the dough and then flatten them on the tray. Make cookies in the size that you want.

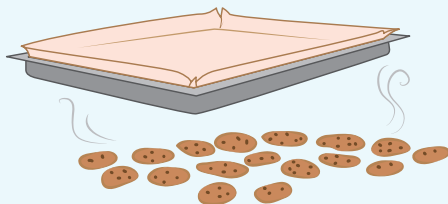


6. Break the chocolate bar in chips and put them over the cookies.



7. Ask an adult to preheat the oven at 180°C (356.0°F). Place the tray with the cookies in the oven for 15 minutes!

8. Leave the tray to cool and ask an adult to help you remove the cookies from the tray!



9. When they are ready, put them carefully on a plate. Place the plate in the fridge so that the chocolate chips can better solidify.

10. Your chocolate chip cookies are ready! You can store them in a flask or in a box!



Consume within 5 days (store in a cool and dry place).

Recipe 3 **Chocolate salami**

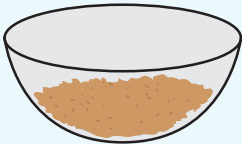
ATTENTION: ask an adult for help.

What you will need:

- Melted butter (100 g)
- Sugar (100 g)
- Chocolate powder (100 g)
- 1 Egg
- Marie biscuits (200 g)
- 2 Bowls
- Aluminium foil

Steps:

1. Use your hands to crush the biscuits into a bowl.

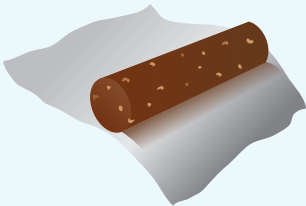


2. In another bowl, mix an egg with the sugar and the butter. Knead the dough well.

3. Add the chocolate powder and the biscuits. Knead the dough again.



4. Shape the dough roughly into a log and wrap it in aluminium foil.



5. Place the salami in the fridge for some time.

6. When you want to delight your family and friends ask an adult to cut the salami in slices.




 Consume within 5 days (store in the fridge).

Recipe 4 **Chocolate yogurt**

ATTENTION: ask an adult for help.

What you will need:

- Natural yogurt
- Glass/plastic cup
- Plastic container with lid
- Mixer
- UHT whole milk (1 litre)
- Kitchen cloth
- Liquid chocolate
- Aluminium foil
- Saucepan
- Silicone spatula 
- Spoon
- Scissors

Steps:

1. Pour 1 litre of UHT whole milk into a saucepan and heat it until it pre-boils (when bubbles start appearing).

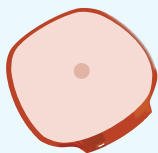




2. Leave it to cool for about 5 minutes.

3. Add the natural yogurt and leave it to rest for 2 minutes.

4. Now, stir the milk well with the mixer, pour the liquid into the plastic container and put the lid on.



5. Wrap the plastic container with a kitchen cloth in order to keep the mixture warm.

6. Store the box in a heated environment, where you can maintain a temperature of about 42-44°C (107.6-111.2°F) (you can place it in the microwave, in the oven or in a thermal lunchbox, with a hot-water bottle).

7. You should leave it to rest for about 6 to 12 hours. The time will depend on your preferences: if you prefer liquid yogurt it should rest for less time (between 6 and 7 hours), but if you prefer solid yogurt it should rest for a little longer (between 11 and 12 hours).

8. Get some glass or plastic cups, so that you can store and conserve your yogurts.

9. Add some spoons of liquid chocolate to the bottom of the cups.

10. When the resting time of your yogurt is over, remove the cloth from the container and open it. Add the yogurt to the cups with chocolate.

11. With the help of an adult, cut aluminium foil squares, with the right size, in order to cover the openings of the cups.

12. Place your yogurts in the fridge in order to conserve them.



 Consume within 3 days (store in the fridge).

Explanation:

During the yogurt production, the milk goes through a fermentation process, this is to say, a process in which catalyzed chemical reactions happen due to the enzymes of the microorganisms' cells.


Such as what happens in every chemical reaction, the most complex substances are 'reduced' to simple substances, but in this case the reactions would not happen without the presence of microorganisms.

Microorganisms present in milk are **lactic acid bacteria** and they are responsible for metabolising the sugar from the milk - lactose - in **lactic acid**, during the lactic fermentation process. The lactic acid allows milk proteins (casein) to join together, forming a sort of mass, that involves other milk components in a process called coagulation. Bacteria grow better at temperatures between 30 and 45°C (86.0 and 113.0°F), that's why you have kept the yogurt in a warm environment. Above this temperature interval, bacteria can't survive and below it, the fermentation speed is quite slow.

Recipe 5 **Ice cream of chocolate yogurt**

ATTENTION: ask an adult for help.

What you will need:

- Natural yogurt
- Glass/plastic cups
- Plastic container with lid
- Mixer
- UHT whole milk (1 litre)
- Kitchen cloth
- Liquid chocolate
- Aluminium foil
- Saucepan
- Silicone spatula 

Steps:

1. Repeat steps 1 to 11 of recipe 4.
2. Place the cups with yogurt in the freezer and leave them to rest overnight.
3. On the next day, your ice creams are ready to be eaten. De-light yourself with your yummy ice creams of chocolate yogurt.



 Consume within 4 days (store in the freezer).

Recipe 6 **Homemade chocolate ice cream**

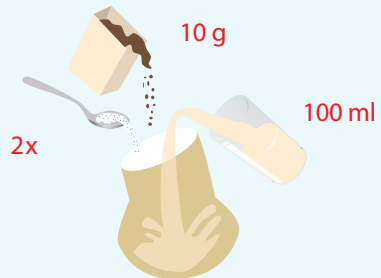
What you will need:

- Milk (100 ml)
- Teaspoon
- Sea salt
- Sugar
- Powder chocolate (10 g)
- Ice cubes
- 2 Freezer bags
- Cups (to serve the ice cream)

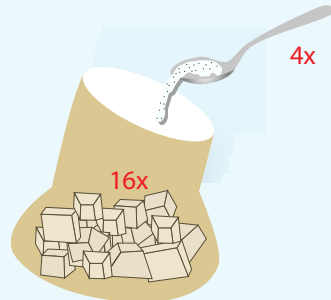
Steps:

1. Pour 100 ml of milk into a freezer bag.

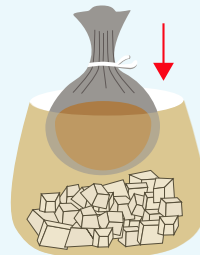
2. Add 2 teaspoons of sugar and 10 g of chocolate. Shake the mixture well.



3. Tighten the bag (you can use a string) and make sure there is no air inside.
4. In another freezer bag, add about 16 ice cubes and 4 teaspoons of sea salt.



5. Put the first bag (that contains milk and the other ingredients) in the second bag (that contains ice cubes and salt).



6. Close the bag tightly and shake it well for at least 5 minutes.




Recipe 7

The best chocolate muffin in the world

ATTENTION: ask an adult for help.

What you will need:

- Wheat flour (210 g)
- Yeast
- Sugar (150 g)
- Chocolate powder (40 g)
- Vanilla essence
- Sea salt
- Milk (250 ml)
- Butter
- Chocolate chips
- Mixer
- Aluminium foil 
- Silicone spatula 
- Sachet of sprinkles 
- 2 Large bowls
- Teaspoon
- Aluminium moulds for cakes 

Steps:

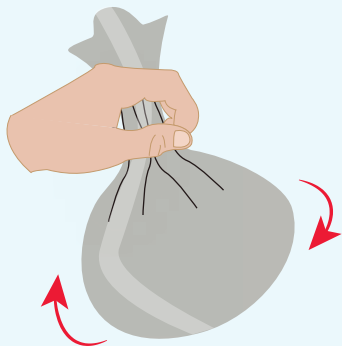
1. In a large bowl, mix the following ingredients:

- 210 g of wheat flour;
- 40 g of cocoa powder;
- 150 g of sugar;
- 2 teaspoons of yeast;
- A pinch of sea salt.

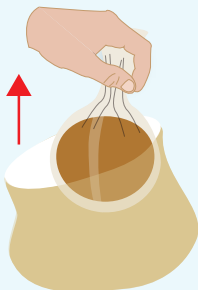


2. In another bowl, create the following mixture:

- 250 ml of milk;
- 100 ml of melted butter;
- Half teaspoon of vanilla essence.



7. Now, open the first bag and remove the second one.



8. Serve the ice cream in bowls and delight yourself with the wonderful ice cream that you have just made. Share your ice cream with friends.

 Consume within 4 days (store in the freezer).

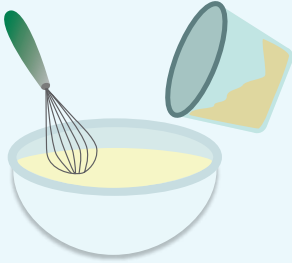
Explanation:

You added sea salt and ice to the second bag, changing the freezing point of water.

This way, the ice melted and absorbed the heat of the milk mixture, that froze immediately.

When you shake the bag vigorously, you are creating air bubbles that stay retained in the milk mixture, giving the ice cream a smooth consistency.

3. Add both mixtures in one bowl and stir well with the mixer, enough for all the ingredients get mixed.



4. Add 60 g of chocolate chips to the mixture and stir again, only for a few seconds until the chips are mixed in the dough.

5. Ask an adult to help you grease the aluminium moulds for cakes with liquid butter. This step is very important so that your muffins don't get stuck to the mould.

6. Fill half the aluminium moulds with the dough.

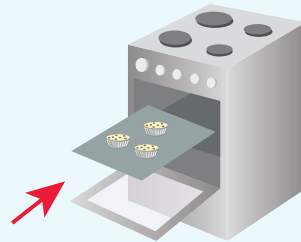


7. Ask an adult to preheat the oven at 180°C (356.0°F).

8. While you wait for the oven to heat, decorate your muffins with some more chocolate chips.



9. Ask an adult to place the moulds on a baking tray and put the muffins to cook for about 25 minutes.



10. After that time, your muffins are ready. Decorate them with the sprinkles and leave them to cool before you show the best muffins in the world to your family and friends.



Tip: Scientist, use your creativity and make new muffins. Try replacing the vanilla essence by lemon zest. The best muffins in the world are yours, have fun and delight yourself



Consume within 5 days (store in a cool and dry place).



Explanation:

Chemical yeast is made of baking soda, acid (usually tartaric acid) and starch. When we put baking soda (which is a chemical base) to react with the acid, alcohol and carbon dioxide are released inside the mixture, causing the formation and retention of air bubbles and the rising of the dough volume. Starch is responsible for absorbing humidity, so that your muffin will be soft and not dry.





Recipe 8

Personalised chocolate lollipops

ATTENTION: ask an adult for help.

What you will need:

- Chocolate bars (dark, milk and white)
- Large plastic cup
- Silicone spatula 
- Piping bag
- Lollipop stick 
- Material used in experiment 1*

*You will not need the silicone mould for sweets

Steps:

1. With the help of an adult, follow steps 1 to 6 of experiment 1 in order to melt the dark chocolate and put it, with the help of the piping bag, in a plastic cup.



2. Place the cup in the fridge for 15 minutes.

3. While you wait, with the help of an adult melt the milk chocolate.

4. When the dark chocolate is completely solid, pour the milk chocolate into the cup and place it back in the fridge for 5 minutes.

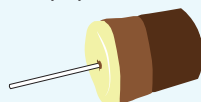



5. After 5 minutes, insert the lollipop stick in the middle of the cup. Place the cup in the fridge for about 10 minutes more.

6. Repeat the steps for the white chocolate. Place the cup in the fridge until the lollipop is completely solid.



7. Remove your lollipop from the cup and it is ready!



 Consume within 3 days (store in the fridge).





Recipe 9

Crispy sweets

ATTENTION: ask an adult for help.

What you will need:

- Chocolate milk bar (100 g)
- Toasted hazelnuts, rice flakes or walnuts (150 g)
- White chocolate (liquid)
- Sachet with sprinkles 
- Tray
- Baking paper
- Spoon
- Silicone spatula 
- Piping bag

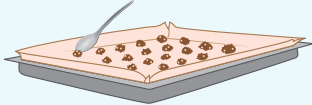
Steps:

1. With the help of an adult, melt the bar in water-bath. Pay attention to the temperatures (read experiment 1 again)!

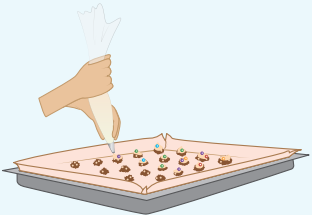
2. Add to the melted chocolate the hazelnuts, rice flakes or walnuts. Mix well with the silicone spatula.



3. Ask an adult to help you line the tray with baking paper. With the spoon, collect a little of the mixture and put it on the tray so that you can start making your sweets! Place them away from each other!



4. Decorate your crispy sweets with the sprinkles or with the melted white chocolate (use the piping bag).



5. Finally, place the crispy sweets in the fridge, for about 1 hour.




 Consume within 5 days (store in the fridge).

Recipe 10 **Brownies**

ATTENTION: ask an adult for help.

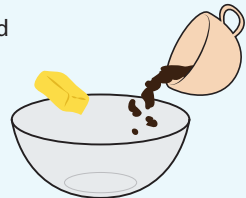
What you will need:

- Butter (300 g)
- $\frac{3}{4}$ Mug of cocoa powder
- $\frac{1}{2}$ Mug of brown sugar
- 3 Eggs
- 1 + $\frac{1}{2}$ Mugs of flour
- White chocolate chips
- Milk chocolate chips
- Tray for cakes
- Bowl (proper for microwave)
- Silicone spatula 
- Baking paper

Steps:

1. Line the tray for cakes with baking paper. Ask an adult to preheat the oven at 180°C (356.0°F).

2. Put the cocoa and butter in the bowl.



3. Ask an adult to help you place the bowl in the microwave until the butter melts.

4. Remove the bowl from the microwave and stir the mixture with the silicone spatula! Add the brown sugar and mix again.



5. Add the eggs and flour, one at a time, and stir your mixture while adding the ingredients. Add the milk chocolate chips and the white chocolate chips.

SUPER LAB CHOCOLATES




6. Put the mixture on the tray and place it in the oven for 30 to 40 minutes.

Tip: ask an adult to check if the brownies are baked. Use a spaghetti to dip it in the middle of the cake, if it comes out clear your brownies are ready!

7. Remove the tray from the oven and leave it to cool for 10 minutes! Now, remove the brownie and cut it in smaller pieces.




 Consume within 5 days (store in a cool and dry place).




Recipe 11 Marshmallow teacakes

ATTENTION: ask an adult for help.

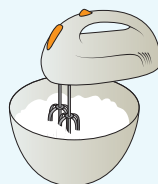
What you will need:

- 6 Egg whites (the yolks can be cooked)
- Icing sugar (250 g)
- Sachet of strawberry jelly
- Chocolate bar
- Sachet with sprinkles 
- Bowl
- Container for water-bath

- Mixer
- Silicone spatula 
- Tray
- Aluminium foil
- Piping bag
- Tablespoon
- Net

Steps:

1. Ask an adult to whisk the egg whites.



2. Add sugar and ask an adult to continue whisking the egg whites until they become stiff!

3. Ask an adult to put the bowl in water-bath and when the mixture starts boiling, whisk again the egg whites.

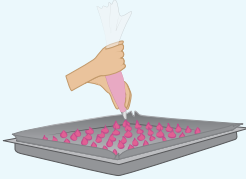


4. In another container, dissolve the jelly content in hot water, such as described on the sachet.

5. Add the jelly to the egg whites and with the spatula involve the mixture!



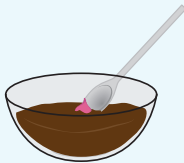
6. Cover the tray with the aluminium foil. Put your mixture in the piping bag and make small balls on the aluminium foil.



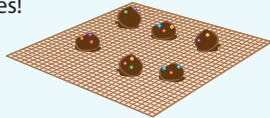
7. Place the tray in the freezer for a day.

8. On the following day, melt the dark chocolate in water-bath. Pour the liquid into a container and mix well.

9. With the help of a spoon, dip the small balls in the melted chocolate.



10. Remove them from the chocolate and leave them to dry on a net. Decorate them with the sprinkles!



11. When the chocolate is solidified your marshmallow teacakes are made!

Tip: to fasten the process, place them in the fridge.



 Consume within 3 days (store in the fridge).

Recipe 12 Confused cake



This cake
isn't solid nor
liquid!

ATTENTION: ask an adult for help.

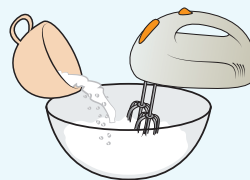
What you will need:

- 3 Eggs
- ½ Mug of wheat flour
- Mug of sugar
- Butter (200 g)
- 1 + ½ Bar of bittersweet chocolate
- Aluminium moulds for cakes
- Silicone spatula
- Large bowl
- Container for water-bath

Steps:

1. Ask an adult to preheat the oven at an average temperature.

2. In a bowl, ask an adult to whisk the eggs with the sugar.



3. In a container with water-bath, melt the chocolate in small pieces together with the butter.



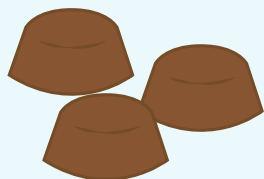



4. Add this mixture to the mixture of eggs and sugar.

5. Mix it all. Pour the mixture into the aluminium moulds for cakes and place them in the oven for 10 minutes maximum!



6. Leave the moulds to cool and then remove the confused cakes!






 Consume within 3 days (store in a cool and dry place).

Recipe 13 Cake Pops

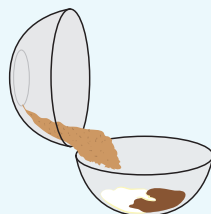
ATTENTION: ask an adult for help.

What you will need:

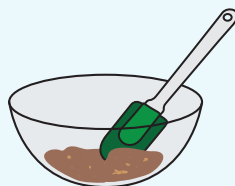
- Lollipop sticks 
- Biscuits
- Bar of milk chocolate (200 g)
- Cream cheese (200 g)
- Hazelnut cream (200 g)
- Sachet with sprinkles 
- Large bowl
- Silicone spatula 
- Tray
- Baking paper
- Cup

Steps:

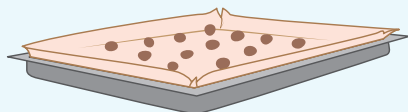
1. Crush the biscuits into the bowl and add cream cheese and hazelnut cream.



2. With the silicone spatula stir well the mixture and leave it to rest for 5 minutes in the fridge.



3. Make balls in the size of the lollipop mould and place them on the tray, over the baking paper.

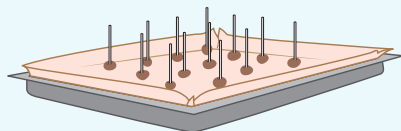


4. Place the tray in the fridge for 30 minutes.

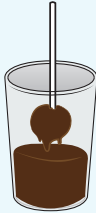
5. With the help of an adult prepare the chocolate for the icing. Melt the milk chocolate in water-bath and pour it into a cup.



6. Place the lollipop sticks in the balls you've prepared in step 3.




7. Carefully, dip the balls in the melted chocolate.



8. Before the icing of your cake pop becomes solid, decorate it with the sprinkles.



 Consume within 2 days (store in the fridge).

Recipe 14 **Popcorn with chocolate**

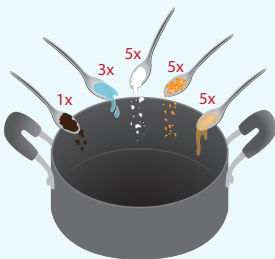
ATTENTION: ask an adult for help.

What you will need:

- 5 Tablespoons of cooking oil
- 5 Tablespoons of corn for popcorn
- 5 Tablespoons of sugar
- 3 Tablespoons of water
- 1 Tablespoon of chocolate powder
- Large saucepan with lid
- Wooden spoon

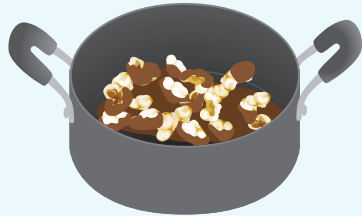
Steps:

1. Put all the ingredients in the saucepan.




2. Ask an adult to help you cover the saucepan, put it on low heat and keep string slowly.

3. Popcorn will start popping after a while. When the interval between the popping becomes shorter, ask an adult to remove the saucepan from the heat.



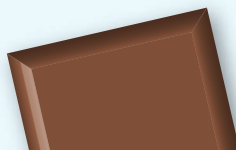
4. Wait a little bit and your chocolate popcorn are ready!



 Consume within 1 day (store in a cool and dry place).

Explanation:

The corn used to make popcorn is made of starch and water. When we heat it, the water in the corn kernel transforms into water vapour and while the temperature rises, the vapour will push the outer layer of the kernel - the pericarp. When the pericarp reaches a very high pressure it bursts! The white part of the popcorn is from the expansion of the starch.






Recipe 15 Chocolate cream

ATTENTION: ask an adult for help.

What you will need:

- Melted unsalted butter (125 g)
- Icing sugar (240 g)
- Chocolate powder (35 g)
- 2 Tablespoons of milk
- Bowl
- Mixer
- Sieve
- Silicone spatula 

Steps:

1. Beat the butter in the bowl until it is homogeneous.

Tip: in order to accelerate the process, ask an adult to beat the butter with the electric mixer until it becomes as white as possible.

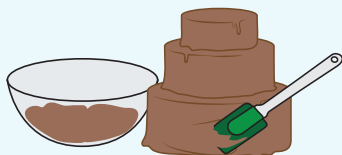
2. Sieve half the icing sugar over the butter.

3. Add the cocoa powder, the milk and then the other half of the sugar.

4. Stir it all well until it is creamy and soft!



You can use this chocolate cream as a filling for croissants or as icing or filling for cakes!




Consume within 2 days (store in a cool and dry place).



Recipe 16 White chocolate mud cake

ATTENTION: ask an adult for help.

What you will need:

- Butter (165 g)
- Chopped white chocolate (100 g)
- Milk (160 ml)
- Icing sugar (295 g)
- Wheat flour (150 g)
- Self-raising flour (150 g)
- 1 Egg
- Cake mould
- Large saucepan
- Silicone spatula 

Steps:

1. Ask an adult to preheat the oven.

2. Grease the mould with butter and then line with flour.

3. Add the butter, the chocolate, the milk and the sugar to the saucepan.

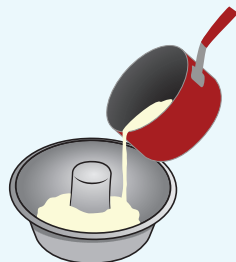
4. Ask an adult to place the saucepan on the stove, over low heat, until it is all smooth.

5. Leave the mixture to cool for 30 minutes.


6. Sieve the flour into the mixture and stir all well.

7. Add the egg and beat it in the mixture.

8. Mix all well! Pour the mixture into the mould and place it in the oven for about 1 hour.




9. You can use the spaghetti technique to check if the cake is ready! Insert a spaghetti in the cake, if it comes out clear, the cake is baked! Leave it to cool before you delight yourself!

 **Consume within 3 days (store in a cool and dry place).**

Recipe 17 **Hedgehog ice cream cake**

ATTENTION: ask an adult for help.

What you will need:

- Aluminium tray for cakes
- Round bowl
- Cling film
- Baking paper
- Aluminium foil
- Silicone spatula 
- Softened ice cream with chocolate chips (3.5 l)
- Chocolate fingers biscuits (chill first in the fridge)

Decorations

- Chocolate topping (180 ml)
- Dark chocolate (semi-sweet), grated finely (100 g)
- Chocolate finger biscuits (400 g)
- Coloured chocolate dragées

Steps:

1. Line the bowl with cling film.

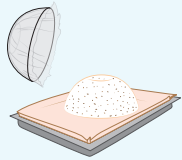


2. Put the ice cream in the bowl; press so that the bowl is full.

3. Cover the bowl with aluminium foil and place it in the freezer for 3 hours.

4. Turn the bowl upside down, on the tray lined with baking paper.

5. Carefully, remove the bowl with the help of cling film.

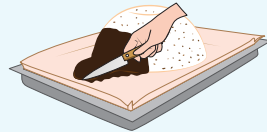


6. With the finger biscuits make the nose of the hedgehog. Insert, carefully, about 2 cm of the biscuit in the ice cream cake.

7. Coat the nose and face of the hedgehog with chocolate topping, such as shown in the image below.



8. Carefully, ask an adult to remove the chocolate in excess with a knife. Put it back in the freezer if necessary.




9. Insert the chocolate fingers in the body (ice cream) of the hedgehog. Sprinkle the grated chocolate between the biscuits.

10. Put a little of topping on the dragées and stick them on the hedgehog face for the eyes.



11. Place the hedgehog ice cream in the freezer until it is ready to serve!

 **Consume within 3 days (store in the freezer).**

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