Science workshop

The science workshop worksheets consist of different science experiments and projects that enable teachers to reinforce and expand upon content and work on the basic competences.

Worksheets:

1. The fun facts album
2. Other languages
3. How to draw animals
4. Planting wild seeds
5. Meet the Moon
6. Finding your way in the dark
7. Making a homemade water treatment works
8. Making a landscapes album
9. The continents puzzle
10. Do you help with chores at home?
11. Building the perfect neighbourhood
12. Learning more about road safety
13. Are there boy games and girl games?
14. Building an olden-day machine
15. Writing an autobiography
16. Going on an online journey
17. Visiting a museum of natural science
18. Visiting a museum of archaeology
1. THE FUN FACTS ALBUM
Science

What is a fun facts album?
This year you’re going to find out some interesting things about people, living organisms, landscapes and other things.
If you write down all these new fun facts in a notebook and decorate the pages with photographs or drawings, at the end of the year you’ll have a book: your “fun facts album”.

What you need
To start your album, you’ll need a notebook, crayons, photos, scissors and glue.

How to make your album
1. Take notes
When your teacher tells you a new fun fact, listen carefully and write down the points you think are most important.
In the notebook you’re going to use for your album, using very neat handwriting, write what you’ve learned. Leave some room to draw a picture or glue in a photo.
Remember that you should always be neat and organised when you’re working on a project.
2. Decorate your album
Once you’ve written the text, decorate your album. Draw pictures and glue photos in the notebook next to the text.
You can get photos from magazines, postcards, newspapers or the Internet.

3. Keep track of the fun facts you learn throughout the year
Repeat the process with all of the interesting information your teacher tells you this year.

Try it! Your own album may look a little bit like this one:
What is the Braille alphabet?

Blind people “read” with their fingers. They use an alphabet like the one you see in the picture. It’s called the Braille alphabet.

Each letter is represented by a pattern of raised dots. Blind people read the letters and the words they form by touching the dots with their fingertips.

1. Write your name in Braille.

2. Do this experiment.
   1. Cut out four pieces of cardboard. Each piece should be about 3 cm wide and 4 cm long.
   2. Choose four letters from the Braille alphabet and write one on each of the pieces of cardboard. Press down hard with your pencil so that the dots are raised.
   3. Close your eyes. Try and guess which letter is written on each piece of cardboard using only your fingertips.
What is sign language?

Deaf people have a language with which they communicate. This language usually works in two ways:

- Deaf people use one or two hands to represent the letters of the alphabet. This is how they spell names.
- They use signs that represent entire things or properties. For example: cinema, theatre, bicycle, nice, father, mountain, train, etc.

Look at the picture below. It shows the sign language alphabet.

3 Write this sign language sentence.

4 In class, use only your hands to represent a bird, a snake, a mountain and a motorcycle.
How to draw, step by step

Drawing animals is a good way to observe them, study their characteristics and understand them better.

To draw an insect, for example, just follow these steps:

1. Draw ovals for the head, the thorax and the abdomen. Then draw a line through the ovals.

2. Draw a few lines to show the angle of the legs and the outline of the wings.

3. Finish drawing the legs and the wings. Add the antennae.

4. Draw in the details of the body and colour it in.
1 Using the steps for drawing insects that you’ve learned, draw the animals in the photos.
What are wild seeds?
In the countryside, especially in autumn, there are thousands and thousands of seeds on the ground. These are wild seeds, the offspring of the plants that grow in the area. As you know, these seeds will grow into new plants. You can see how by doing this experiment.

What you need
A flowerpot or another container, sheets of newspaper, wellington boots and a stick.

Collecting and planting seeds, step by step

1. Go for a walk in the countryside
In order for this experiment to work well, try to go for a walk in autumn. You’ll also get better results if it has rained recently and the ground is a little muddy.
When you get to the countryside, find a place with a lot of plants and walk around it slowly, being sure to step in muddy spots. Your boots will pick up seeds from the ground.

2. Scrape the mud off your boots
Put a few sheets of newspaper down and stand on them while you take your boots off.
Using a small stick, scrape the mud off the soles of your boots and make sure it lands on the sheets of newspaper.
Collect all of the dirt from the sheets of newspaper and put it in the flowerpot or another container.
3. Take care of the flowerpot
When you get home or to school, put the flowerpot in a warm, sunny spot. Water it every day.

After a few days, the seeds that stuck to the bottom of your boots will sprout. In other words, tiny new plants will have started to grow.

4. Compare flower pots with your classmates
After a few days, compare the plants that have sprouted in the different flowerpots in class.

1. Draw the plants you see in your flowerpot.
5. MEET THE MOON
Science

Name and surname: .................................................................
Class: .......................................................... Date: .................................................................

Have you really looked at the Moon?

Take a good look at the Moon one day when it’s full. If you use binoculars, you’ll see more details.

Try and draw the light and dark smudges you can see on its surface, or take a photo. This will help you to remember exactly what it looks like.

Around 27 days later, look at the full Moon again. If you compare it with your drawing or the photograph from a month ago, you’ll see that it’s the same, that it has the same light and dark smudges in the same positions. The same will happen every time you look at it.

Do your drawing here, or glue on the photograph you’ve taken.
The Moon is a sphere which turns on its axis. So, shouldn’t we see different smudges and craters each time? Well, no. From Earth, we always see the same side of the Moon (the visible side); the other side of the Moon, the side which is never seen from Earth, is called the hidden side or the dark side.

To help you understand why this happens...

**Let’s do an experiment!**

We’re going to simulate the movements of the Earth and the Moon. To do this, choose a partner. One of you will sit in the middle on a swivel chair. The other will stand a distance away. Look carefully at the picture:

- **The pupil in the middle is the Earth. This person must turn round slowly, using the swivel chair.**
  This way, you’ll be simulating the movement of the Earth’s rotation.

- **The person who is pretending to be the Moon must also turn round in circles, but at the same time, rotate around the centre.**
  This will simulate the two movements of the Moon; rotation and orbit around the Earth. The key to why we always see the same side of the Moon from the Earth is in the speed at which our satellite revolves.
Do two tests

- In the first, the pupil who is pretending to be the Moon has to spin very fast on their axis (very fast rotation) and very slowly around the pupil who is pretending to be the Earth (slow orbit). Don’t get dizzy now!

  The Moon rotates quickly

  The Earth rotates

  The Moon orbits slowly

- In the second test, the pupil who is pretending to be the Moon has to spin slowly on their axis (slow rotation) and more quickly around the pupil who is pretending to be the Earth (quick orbit). Try to make the speed of the rotation coincide with the orbit speed.

  The Moon rotates and orbits at the same speed

  The Earth rotates
Conclusions

What happens in test 1?

Explain what the pupil who is pretending to be the Earth can see. Do they always see the same side of the pupil who is being the Moon? Why?

What happens in test 2?

Explain what the pupil who is pretending to be the Earth can see. Do they always see the same side of the pupil who is being the Moon? Why?
6. FINDING YOUR WAY IN THE DARK

Science

It’s night-time. Which way is north?

You’re sure to know how to get your bearings when it’s daytime and you can see the sun in the sky: our star rises in the east and sets in the west.

But, when it’s night-time, how can you get your bearings?

Just like you did in the daytime, at night-time you have to look for a reference point in the sky which coincides with one of the cardinal points.

First of all, let’s look at the sky

Choose a clear night at the weekend and, with an adult, go out to an open space to look at the stars. Choose two really bright stars and draw their positions, taking a fixed point on the horizon as a reference (a tree or a hill). Do the same a couple of hours later and you’ll see that their positions have changed.

The apparent movement of the sky is due to the rotation of the Earth; because of this rotation, it seems to us that the whole sky turns around one point in the sky.

More specifically, in the northern half of the Earth the sky seems to turn around one very dim star: the North Star. If you look towards this star, you will be looking due north.

The closer to the North Pole the person is, the higher in the sky the North Star is seen.

In the southern half of the earth, the group of stars that approximately show the South Pole is the Southern Cross constellation.
How to locate the North Star

From what we’ve seen, we can deduce that to find where north is at night in this half of the Earth, we have to look for the North Star. To do this, follow these steps:

A. Find a very bright group of stars in the sky, in the shape of a big dipper. This is a constellation: the Great Bear, or Ursa Major.
   The Great Bear can be seen in the sky all year round and all night long.
B. If we draw an imaginary line about five times longer than the widest side of the big dipper, we’ll find the North Star.
C. The North Star is at the very end of the Little Bear’s tail.
   The North Star isn’t a bright star. In fact, the Little Bear can barely be seen in the sky over many cities, or on nights that aren’t very clear.

1 Look at this picture and apply what you’ve just learned to label the directions of the four cardinal points.
Wastewater and its treatment

The water that reaches our homes comes from rivers or lakes, but it is treated so that it is clean and drinkable. This means it is transparent and odourless, with no microorganisms or harmful substances.

In contrast, when the water leaves our homes and reaches the sewers, it’s murky, greenish-brown, it smells bad and it’s full of microorganisms and potentially harmful substances. This used water is called wastewater. If we were to put it back in the rivers in this condition, we would probably destroy many living organisms that live in those rivers.

So that this doesn’t happen, we have to take the impurities out of wastewater before sending the water back to the rivers. This process is called treatment, and it is carried out in special facilities called water treatment works.

The water which has been treated IS NOT FIT FOR PEOPLE TO DRINK, but it can be used, for instance, to water plants or clean the streets, among other things. Most importantly, the treated water can be returned to rivers without any danger to the ecosystems.
Let's create some wastewater

Wastewater is water that contains a variety of solid and liquid waste, produced by human beings. This water is contaminated. You can create your own wastewater if you mix water in a container with:

- Solids: bits of paper and plastic, dirt, breadcrumbs, etc.
- Liquids: oil, milk, etc.

How to treat our wastewater

Wastewater treatment means applying a method to separate the water from the waste matter that contaminates it to get clean water.

To treat the sample of wastewater that we’ve created, we’ll use a homemade water treatment works like the one shown in the picture on the right. Take a look at the drawing and try building it.

What elements of the wastewater get trapped in the grate?

Describe how the water comes out through the lowest end of the treatment works. Try to explain why.
8. MAKING A LANDSCAPES ALBUM

Science

Name and surname: ...................................................................................................................
Class: ............................................................................................................................
Date: ............................................................................................................................

Let’s do some teamwork

In this activity, we’re going to make an album with photographs or pictures of some of the most representative landscapes from where we live. We’re also going to do a study of the elements of those landscapes and some of their aspects.

You can make an album by yourself, but it’s better if everyone in your class works together.

To work as a team, each of you should choose a landscape. This can be one from where you live or one that you noticed during a day in the country. It doesn’t have to be pretty.

Whatever it’s like, try to take a photograph of it. Nowadays, it’s easy to get hold of a digital camera. You can ask an adult to let you use one which is easy to handle, for instance a mobile phone’s built-in camera or a simple compact camera.
Tips on taking photographs of landscapes

• When taking the picture, try to include a wide area of land. To do this, zoom in as little as possible. Most cameras will include a wide area of the horizon on the lowest setting.

• Don’t take the photograph with the sun in your eyes. You’ll get a white area in the sky and a very dark landscape that you won’t be able to see anything in. It’s better to wait until the sun is high in the sky, to the side, or behind you.

• Then print the picture, stick it onto the next page and fill in the questionnaire with the details of this landscape. To identify certain elements shown in the picture, you can write or stick small numbers or letters onto the photo.

• If you all do this, you’ll have a collection of landscapes with labels which you’ll be able to study.
Landscape worksheet

Stick the photograph here

Landscape located in

Time and date photograph was taken:

Comments (point from which the photo was taken, difficulties, interesting story about the photo, etc.)
### Classification of landscape

(in each case, cross out the one that doesn’t apply).

- According to whether human elements are present:
  - [ ] Natural
  - [x] Man made

- According to its relief:
  - [ ] Flat
  - [x] Mountainous

- According to how close it is to sea:
  - [ ] Inland
  - [x] Coastal

### Aesthetic assessment:

(If each class member who sees this worksheet ticks one of the boxes if this landscape looks beautiful to them, you’ll have an indication of what they think about it. A lot of ticks means the landscape is beautiful for the majority. Few ticks means that most people don’t like the landscape).
Somebody’s cut my map up

Richie was given a map of the world, but his little brother has cut it into eight pieces.
1 Cut out the pieces of map and glue them onto this worksheet to put Richie’s present back together properly. Then label the continents.
Let’s take a survey

Do you help much with chores at home? Have you ever stopped to think hard about this? This survey will help you to draw some pretty realistic conclusions.

1 Name the household chores that you are responsible for doing on a given weekday.

2 Write down which chores you did each day last week.
   • Monday:
   • Tuesday:
   • Wednesday:
   • Thursday:
   • Friday:
3. Name the household chores that you are responsible for doing at the weekends.

____________________________________________________________________________________________________________________________________________________
____________________________________________________________________________________________________________________________________________________
____________________________________________________________________________________________________________________________________________________
____________________________________________________________________________________________________________________________________________________

4. Write down which chores you did last weekend.
   • Saturday:
    ____________________________________________________________________________________________________________________________________________________
    ____________________________________________________________________________________________________________________________________________________
   • Sunday:
     __________________________________________________________________________________________________________________________________________________
     __________________________________________________________________________________________________________________________________________________

5. Now, draw conclusions and write them down.
   a) Do you think you help enough?
     __________________________________________________________________________________________________________________________________________________
   b) Do you think you’ve got too many chores to do?
     __________________________________________________________________________________________________________________________________________________
   c) What ideas do you have to improve the situation?
     __________________________________________________________________________________________________________________________________________________
11. BUILDING THE PERFECT NEIGHBOURHOOD

Science

A study of the neighbourhoods in a place

All large towns or cities usually have neighbourhoods. This means they have areas which have individual characteristics that make them different from other areas in the same place.

If you live in or visit one of these large towns or cities, you can do a study of its neighbourhoods. It would be a good idea to focus on an old central neighbourhood and a more modern one in the suburbs. Fill in this worksheet with information on each neighbourhood.

Basic information on the neighbourhood

- Name: .........................................................................................................................
- City or town where it’s located: ......................................................................................

Description of its main characteristics

- Streets (width, length, surface, street furniture, etc.)

- Buildings (age, height, space between them)

- Are there any parks or gardens?

- Are there any places of cultural interest (theatres, monuments, museums, etc.)?

- Are there shops and restaurants?
• Are there offices, factories or other workplaces?

• Is there public transport?

• Noise level

• Traffic level

• How clean is it?

1 Compare the two neighbourhoods you’ve studied and fill in the table.

<table>
<thead>
<tr>
<th></th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Old central neighbourhood</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Modern neighbourhood in the suburbs</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2 Now use a blank sheet of paper to draw a map of what you think a perfect neighbourhood would be like, with most of the advantages of old central neighbourhoods and more modern ones in the suburbs, and, if possible, without the disadvantages.
Traffic signs

There are different types of traffic signs:

• Upright road signs
• Road markings
• Illuminated signs (lights and warning signs)

Upright road signs

Upright signs are the signs on posts at the sides of the road or above it. These signs can be of four types: signs that indicate something is forbidden, signs that tell you what you must do, signs that warn of danger and signs that give information.
Road markings

Road markings are signs that are painted on the surface of the road or street.

**Road markings**

- **Warning**: You are coming up to a stop sign. Arrow indicating the direction traffic moves in.
- **STOP**
- **Continuous line**: NO OVERTAKING
- **Broken line**: OVERTAKING IS PERMITTED (if no one is coming in the opposite direction)
- **Green light**: Vehicles may pass.
- **Red light**: Vehicles must stop.
- **CAUTION**: Indicates that the light is going to turn red and that vehicles must give way.
- **Illuminated signs**

Illuminated signs are traffic lights or signs indicating danger because of roadworks. There are traffic lights for vehicles and for pedestrians.
Road safety rules

When you’re travelling in a vehicle, on a highway, or in the city, or when you’re walking along a street or a road, there are certain rules which you have to observe, both for your own safety and for the safety of others.

Rules for travelling in a vehicle

• When you are travelling by car you must always have your seat belt fastened.

• On the bus, you should always be seated and have your seat belt fastened.

• You mustn’t put your head, your arms or any other part of your body out of the window.

• You must never distract the driver of a vehicle when they are driving.

• If you are travelling with animals, they must go in the proper compartment.

Rules for pedestrians

• You can’t walk along the edges of motorways or dual carriageways.

• On roads, you must walk at the edge of the road, in single file and on the left (if you are in a country where the traffic drives on the right).

• You should cross the street at a pedestrian crossing.

• When crossing the street you should always make sure that there is nothing coming.
Are you clear about this?

1 Look for information and say which groups these signs belong to and what each one of them means.

2 Which vehicle can overtake if nothing is coming in the opposite direction on this road, the vehicle travelling in direction A or the vehicle travelling in direction B? Explain why.
13. ARE THERE BOY GAMES AND GIRL GAMES?

Science

Let’s set out the rules of the debate

We’re going to talk about a subject in class, and all the pupils are going to take part if they wish, explaining what they think. Logically, there will be some very different opinions.

If we all want to talk at the same time, if each person talks about something different, or if we all want to prove ourselves right, it will be impossible to reach any conclusions. That’s why it’s a good idea, before we begin, to set out some rules like these ones:

1. There must be a moderator; this will be the teacher.
2. The moderator will give pupils their turn to speak.
3. Anyone who wants to speak must put their hand up quietly and wait until the moderator says it is their turn to speak.
4. When it isn’t your turn to speak, you must listen to the classmate who is speaking, and remain silent.

Let’s start talking

The moderator will ask this question: Do you think that there are games which are just for boys and games which are just for girls?

• Those who think there are will go to one side of the classroom (GROUP 1).
• Those who don’t think so will go to the other side of the classroom (GROUP 2).

You can make a list of games which you usually play during break or in your free time, and the moderator will ask:

1. Are there any games on the list which either boys or girls can’t play? Those who think so must say which games they are, and say why. (CHILDREN FROM GROUP 1’S TURN TO SPEAK).
2. Those who don’t think so should say why. (CHILDREN FROM GROUP 2’S TURN TO SPEAK).
3. Are there any games on the list which girls like more or boys like more? (GROUP 1 AND GROUP 2 TAKE TURNS SPEAKING).
4. Do you think that everyone, girls and boys, should play all the games they want or that they like? (THE TWO GROUPS TAKE TURNS SPEAKING).
We draw conclusions

As the debate is coming to an end, you can fill in the table below, bearing in mind the opinions of the majority.

<table>
<thead>
<tr>
<th>Game</th>
<th>Who likes it more?</th>
<th>Why?</th>
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Use the conclusions that have been written down during the debate to answer these questions.

1. Do you think there are games that girls like more and games that boys like more? If you think so, give an example and explain your answer.

2. Would you prefer each boy or girl to play the game they want to play or do you think that boys and girls should play different games?

3. In your class does each girl and boy play the games they like?
The first machines

Human beings have been using machines for thousands of years. The oldest and simplest of them all is the lever. A simple big stick used to help our ancestors in the Stone Age move huge trunks or rocks. Later on, the first wheels appeared. They were put on carts to help carry heavy objects from one place to another. At first, machines moved with the energy from human strength, from animals or due to gravity. But soon people learned to turn wheels with the power from water currents or the wind. Thanks to these first machines which ancient inventors thought up and put together, human beings survived and prospered for centuries.
**Being an inventor in the olden days**

Imagine that you live in a very ancient time when they didn’t know about machines, in a village where they have two problems:

**a) Getting water.** The banks of the river are very steep. People can’t get down to the water and it’s difficult to collect the water. They collect water by throwing down a leather bag tied to a rope, but it can’t be very big because it weighs too much to get it back up.

**b) Defence.** Every summer, the inhabitants of a village on the other side of the river, who are pretty nasty people, attack the village to steal food. People have always said that the villagers would be able to defend themselves very well if they could throw big stones towards the river to sink their canoes before they crossed.

The villagers don’t know that you are from the future and that you know about simple machines. But you remember seeing the picture on the right in a book. It can give you clues to help you make your invention.

1. Use your special knowledge to design and build a machine which can solve the two problems they have in the village.

2. Explain how your machine works.
15. WRITING AN AUTOBIOGRAPHY

Events in your life

Write the facts that are most important to you in your biography. You can illustrate your story by glueing in photographs or drawings.
16. GOING ON AN ONLINE JOURNEY

Science

Name and surname: ...................................................................................................................
Class: .......................................................... Date: ..........................................................

The universe on the Internet?

You already know that the Internet is a network made up of lots of computers from all over the world which are connected to each other. Many of these computers contain information which is available for people from anywhere in the world to consult.

To have access to that information, all you need is a computer connected to the Internet with a browser installed.

Browsers are programmes which are capable of exploring the “addresses” that the computers have on the Internet, and gaining access to their information.

Among the most interesting activities that you can do when surfing the Internet is to make virtual visits to places: buildings, museums, natural spaces, cities or even... the solar system!

You’re sure to know that the United States Space Agency, NASA, has a web page. Among the many things that this page has is an application called “Eyes on the Solar System”, which lets you make a virtual visit to the Sun and its planets and satellites.
If possible, ask your teacher to install the application on one of the school computers or ask your family to install it on your home computer.

Thanks to this application, you can “travel” all around the solar system, circle the planets and find out information on them…

And if you want even more information, you can visit the rest of the NASA page.

Another web page which gives information on the solar system is the European Space Agency (ESA) web page. It has a section for children in various languages.

1 Look at these pages to find pictures and information about your favourite planet.
17. VISITING A MUSEUM OF NATURAL SCIENCES

Visit worksheet

During your visit to the museum, take notes in a notebook, so that afterwards you have information and can fill out this worksheet.

Basic information on the museum

- Name of museum: .................................................................

- Address: ............................................................................

Details of the visit

What field of science does this museum explore?

Give a brief explanation of what the museum contains.

Which object or part of the museum did you find most interesting? Why?

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Drawings and photographs of the visit, with comments
18. VISITING A MUSEUM OF ARCHAEOLOGY
Science

Visit worksheet

During the visit to the museum, take notes in a notebook, so that afterwards you have information and can fill out this worksheet.

Basic information on the museum

Name of museum: ......................................................................................................................

Address: ....................................................................................................................................

Details of the visit

What historic eras are shown in this museum?

Name three objects on display in the museum and say what kind of historical sources they are.

Which object or part of the museum did you find most interesting? Why?

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Drawings and photographs of the visit, with comments