



Women Scientists: Now, Then and Always

In a Nutshell

Who do we think of when we talk about scientists? Archimedes? Einstein? Ramón y Cajal?

There are hundreds of women scientists as well! In this project, pupils will have to do some research in order to create a timeline of women scientists. Important facts such as who they were or are, what their research is about, if they were free to speak about their research or, on the contrary, they had to work covertly.

With the help of their families, they will collect information about the woman scientist they have been assigned to. They will take some facts about their discoveries to class and will share them with their classmates. Later, they will work in groups to show the information and create a timeline of women scientists throughout history.



LEARNING OUTCOMES

- Use different historical, geographical and artistic sources to produce historical reports and projects.
- Women scientists in history.

BASIC COMPETENCIES

- Listen to and understand simple instructions and classroom routines in English given by the teacher.
- Identify and acknowledge cultural differences appreciating various features of identity which contribute to tolerance and integration.

HOME-SCHOOL CONNECTION

School-Home: The teacher will show pupils a list of women scientists. With the help of their families, each pupil will do some research on the life and work of one of these women.

Home-School: Families will provide pupils with the information they need to learn about their woman scientist. There are several websites focused on women scientists that include interesting activities and information. If there are any women scientists in their families or they know anyone else, it would be a good idea to invite them to class so they can briefly explain what they do. It would be very inspiring for kids!

Timing: 2 h 15 min

Session 1: 20 min + 25 min		Weekend	Session 2: 45 min	Session 3: 45 min
Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
Introduction	Research	Planning	Creating	Presentation

Materials

• Pictures of women scientists
• A3 coloured card
• Pencils and crayons
• Scissors
• Glue

Stage 1: Introduction (20 min)

Ask your pupils questions to find out what they know about women scientists:

- Do you know any scientists?
- Do you know more men or women scientists?
- Which women scientists do you know? What did or do they do?
- Which ones are still alive? Which ones lived in the past?

Show your pupils various photographs of some women scientists and ask them if they can recognize any of them and if they know what their contributions to science are.

Would your pupils like to travel in time through these devoted women scientists?



Maria Curie



Margarita Salas



Indira Nath



Jane Goodall



Pilar Mateo



Tu Youyou



Hypatia of Alexandria

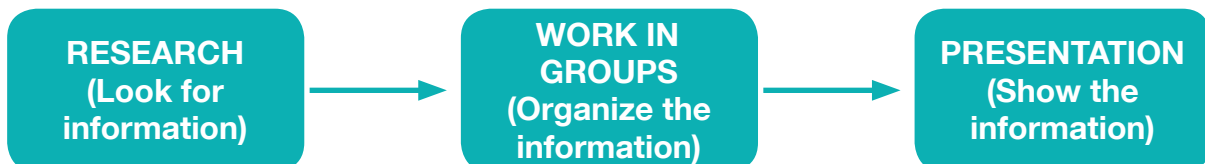


Katherine Johnson



Ada Lovelace

Then, explain them the following stages of the project:





Stage 2: Planning (25 min)

Make a list of women scientists of today and the past. Include as many women as pupils there are in your class. Some of them can be:

Hypatia of Alexandria	Fermina Orduña
Ada Lovelace	Rosalind Franklin
Marie Curie	Mary Somerville
Tu Youyou	Maryam Mirzajani
Jane Goodall	Katherine Johnson
Indira Nath	Grace Oladunni Taylor
Ángeles Alvariño	Margarita Salas
Elena García Armada	Ángela Ruiz
María Vallet-Regí	María Blasco
Sophie Germain	Pilar Mateo
Maria Gaetana Agnesi	Emmy Noether
Sofia Kovalévskaya	Nashwa Eassa
Émilie du Châtelet	Barbara McClintock
Indira Nath	Sara Borrell

Each pupil will choose one woman scientist to do some research on, with the help of their families.

They should draw special attention to their scientific research and the challenges they had or have had to carry out their work.

Remind them that some years ago, some women had to pass as men to be able to study, work and publish their scientific breakthroughs. Furthermore, the scientific community used to award prizes (as important as the Nobel Prize) to the tutors or husbands of certain women, since it was unheard of to acknowledge that a woman could have carried out scientific work successfully.

Stage 3: Research (over the weekend)

With the help of their families, each pupil will do some research on the life and work of the woman scientist they have chosen or been assigned to. Their contributions and the difficulties they had or have had for being a woman in the world of science.

At the end of the project, the family will have to help the child to complete an evaluation about their involvement in the project.



Stage 4: Creating (45 min)

Put pupils in groups of four or five and tell them that they must work together to do the following:

- Show the photographs and information they have brought from home, briefly explaining to their classmates who their woman scientist is, a summary of her biography and her main contributions. They should focus on the difficulties she had or has had, if any, for being a woman in the world of science.
- You will encourage each group to classify these women according to their scientific field: mathematicians, biologists, physicists, etc. Each scientific field will be represented by different coloured cards which will be chosen all together by the class. Therefore, each pupil will put together the photograph and the information about their woman scientist with the corresponding coloured card.
- Later, each pupil will write a summary on their card showing the main ideas of their scientist:
 - Name and photograph
 - Date of birth and date of death (if any)
 - Scientific field
 - Scientific studies and breakthroughs
 - Acknowledgements and awards
 - Difficulties they had when developing or publishing their work

Give them ten minutes to make plans, and then stop by their tables so that you can explain the directions in further detail, or help them with any problems.

With the last ten minutes of the session, tell them to plan the next stage (Presentation). Explain the rules for this:

1. Pupils will hang up their coloured cards in an orderly manner according to the date of birth of the scientists. This way, they will produce a visual timeline of *Women scientists in history*.
 2. Starting from the first woman scientist in the past, each pupil will make a brief five-minute presentation of their corresponding woman scientist, commenting on the most important or remarkable facts.
 3. After each presentation, there will be one or two minutes for the rest of the class to ask any relevant questions.
- At the end of the session, ask your pupils these some questions:
 - *What do women scientists from the past have in common?*
 - *What characteristics do you think women scientists of today have?*
 - *Do you think the acknowledgement of women in the scientific field has improved over the years? What could be done better?*
 - *How do you imagine women scientists of the future?*

Stage 5: Presentation (45 min)

A few days before presenting their women scientists, place their projects in a visible area in the classroom.

The day of the presentation tell each pupil to remember the rules of presenting, and that they must manage their time.

If the teacher sees appropriate, they can invite those pupils' female family members who have some kind of connection with science so that they can share their experience at the end of the presentation.



Digital Tip

The teacher can recommend pupils and families some websites (in Spanish) related to science, such as:

- The Spanish National Research Council (CSIC) for children: <http://www.kids.csic.es>
- Magazines or other websites related to science: <http://principia.io/mujeres-ciencia/>
- Projects from other schools about women in science: <https://www.educa2.madrid.org/web/laboratorio-jcosta/inicio>
- A timeline tool: <https://www.timetoast.com/>

Emotional Tip

Pupils work on social competency of emotional education throughout this project by becoming aware of the role women have played in science and technology throughout history.

Pupils must be aware of the challenges that have existed and still exist today. Moreover, it is vital that they understand that both men and women are able to carry out scientific research.

Respect for others and defence of equality of working conditions between men and women is essential to develop a more just society in the future. The term *feminisim* could be introduced at this stage to make sure that pupils understand the concept.

Evaluation

This project consists of three different types of evaluation with user-friendly methods for pupils and families. These evaluations include pupil self-evaluation, self-evaluation at home with the family and group evaluation.

The first part of the evaluation has a point system of 1 to 4 where pupils can take responsibility for their own learning and become more autonomous. The objective of pupil self-evaluation is to provide opportunities to reflect on their work, what they did well and how they can further improve, with the goal of enhancing the learning process and leading to a feeling of fulfilment.

The aim of the first graph requires pupils to rate their families' involvement in the project by colouring the graph. Pupils will be helped by their families who will rate the work, input and attitude shown at home. With this creative system of evaluation, families have direct communication with their child's learning process.

In a similar way, with the teacher's help, the group will evaluate the input of all the members' contribution who have participated in the project. In general, pupils tend to colour all the areas in only one colour. The important thing is that through these goals pupils gain a sense of their own work and that of their classmates.



PUPIL'S NAME:
 PROJECT:

Self-Evaluation

Evaluation Criteria	-				+
	1	2	3	4	
Have I learnt about women scientists I didn't know about?					
Have I summarized well the information I learnt about the woman scientist I did the research on?					
Have I explained well the information to my classmates?					
Have I placed my woman scientist correctly within the timeline?					

Family Evaluation

We liked doing research together as a family.

We have enjoyed doing research on women scientists.

We have found the information we needed.

Group Evaluation

We have taken turns when speaking.

We have found solutions to problems.

We have done our best when working.

We have learnt things we didn't know about.

We have helped each other.

We have all contributed as team members.



Key Vocabulary



- scientist
- mathematician
- writer
- engineer
- physicist
- chemist
- philosopher
- astronomer
- inventor
- prize

Useful Expressions

- I admire this person.*
- I've chosen this woman scientist because ...*
- Some women find themselves in unfair situations.*
- Gender inequality should come to an end.*
- Feminism means equality.*

