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Plan de leçon e-SOC

Les femmes qui ont changé le monde

Objectifs d'apprentissage:

(INTELLIGENT)

En terminant cette session/la classe, les participants:

- Identifier les femmes plus performantes dans STEAM
- être plus motivé pour promouvoir les femmes dans les matières STEAM
- avoir plus de confiance pour poursuivre une carrière dans STEAM (pour les filles étudiantes qui pensaient qu'elles ne pouvaient pas y parvenir)
- traiter les autres étudiants de manière égale lorsqu'ils font des projets STEAM, quel que soit leur sexe

Résultats d'apprentissage:

(Utiliser la taxonomie de Bloom verbes d'action)

En terminant cette session/la classe, les participants auront:

Connaissances:

pour former des attitudes correspondant au sujet discuté dans la leçon

Compétences:

identifier les compétences qui engageront plus de filles dans STEAM

Attitudes:

démontrer un changement dans l'approche des préjugés sexistes dans la classe STEAM

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Groupe cible:

Enseignants/élèves de l'école secondaire (12-15)

Activité Titre et numéro	**Brève description de l'activité**	**Ressources nécessaires**	**Temps** 2hs au total
Plomb dans: **1.** Brise-glace	Une activité de brainstorming répondant à la question: *Quelles sont les qualités d'un scientifique?* Exemples: créativité, rigueur, patience, persévérance et ainsi de suite	Annexe 1 Tableau de bord Marqueurs	20'
2. Quiz	Cette leçon révèle les noms de 19 femmes qui ont contribué à faire de l'histoire en science. L'annexe 2 contient des informations sur chacune de ces femmes. 19 participants (ou moins, s'il n'y a pas de volontaires) recevront des informations sur l'une de ces personnes. Ils doivent se faire passer pour le personnage qu'ils ont reçu et le présenter au groupe. Exemples: - ils peuvent partager les informations qu'ils ont reçues - ils peuvent inventer une histoire sur la vie de cette personne, en se basant sur les informations disponibles et l'époque dans laquelle ils ont vécu. - ils pouvaient imaginer des traits de personnalité et en parler. - ils pouvaient imaginer comment ils ont réussi dans leur carrière - ils pouvaient imaginer la raison pour laquelle cette personne devait devenir un scientifique.	Annexe 2	40'
3. Discussion	Une discussion de groupe basée sur la première activité. Les participants avaient-ils connu les réponses? Avaient-elles eu des connaissances sur les femmes importantes de STEAM	Tableau de bord Marqueurs	25'

	tout au long de l'histoire? D'un point de vue historique, les femmes scientifiques étaient-elles autant que les hommes? Quelles étaient les raisons de la faible participation des femmes à la science? Les choses ont-elles changé aujourd'hui? Comment? Les principales idées et conclusions peuvent être enregistrées sur le tableau de bord pour que tous puissent le voir.		
4. Domino	En paires ou en petits groupes, les participants jouent au domino avec des personnalités STEAM. Le jeu est similaire au classique Domino, la seule différence étant que les participants n'ont pas à faire correspondre des photos identiques, mais la photo (et le nom) de la scientifique avec son domaine respectif. Chaque jeu de cartes domino sera accompagné d'informations reliant les noms et les champs. C'est pour aider les participants à faire leurs matchs, s'ils ont entendu les noms pour la première fois. Le but de ce jeu est de consolider les connaissances acquises lors du quiz. Les cartes domino auront les mêmes personnes que le quiz.	Cartes Domino (annexe 3, à imprimer et à découper) Fiches d'information (annexe 2, à imprimer)	15' — 20'
5. Retour d'information	Les participants donnent un bref retour d'information sur l'activité. Cela peut être fait oralement, par post-it ou en remplissant un formulaire en ligne. Quoi qu'il en soit, les participants répondront aux questions suivantes? **I. Sur une échelle de 1 à 10 (1 — pas du tout, 10 — très)** 1. Quelle était l'utilité de cette activité? 2. Dans quelle mesure l'activité était-elle engageante? 3. Combien avez-vous apprécié cette activité? 4. Combien avez-vous appris de cette activité? **II. Qu'auriez-vous fait différemment?** **III. Allez-vous promouvoir l'égalité des sexes dans les activités STEAM? Si oui, comment?**		20'

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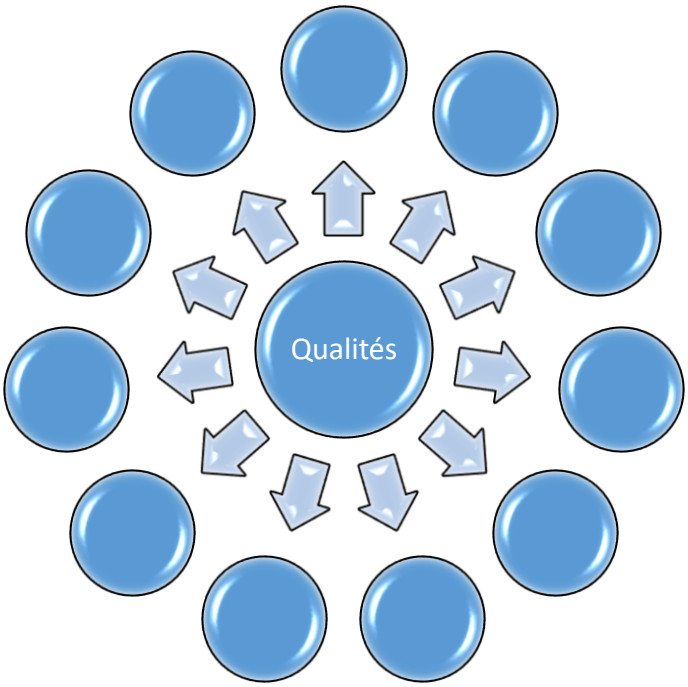
Annexes:

ANNEXE 1

Écrivez pendant deux minutes tout ce qui vous vient à l'esprit lorsque vous entendez les *qualités d'un bon scientifique*. Remplissez les cercles:



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ANNEXE 2: LES FEMMES QUI ONT CHANGÉ LE MONDE

TIERA GUINN

Born and raised in a small town near Atlanta, Georgia, Tiera Fletcher (Guinn) has had a passion for aerospace engineering since the tender age of eleven. Before then, she had aspirations of being a scientist, inventor, architect, mathematician, and many other careers within the field of STEM. It was not until she became introduced to the field of aerospace engineering that she realized her true dream. Tiera graduated from the Massachusetts Institute of Technology (MIT) with a Bachelor's of Science in Aerospace Engineering in June 2017. During her time at MIT, she was also a part-time Rocket Structural Design and Analysis Engineer at The Boeing Company, specifically working on NASA's Space Launch System. Currently, TIera is a full-time employee of The Boeing Company working to build NASA's Space Launch System in New Orleans, LA. She has a strong interest in helping upcoming generations to realize and achieve their dreams. Tiera enjoys speaking to youth to not only encourage them to become more involved in STEM, but to reach their goals in any field they wish to pursue.

Source: https://www.engineergirl.org/40724/Tiera-Fletcher-Guinn

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MARIE CURIE

Marie Curie, *née* Maria Sklodowska, was born in Warsaw on November 7, 1867, the daughter of a secondary-school teacher. She received a general education in local schools and some scientific training from her father. She became involved in a students' revolutionary organization and found it prudent to leave Warsaw, then in the part of Poland dominated by Russia, for Cracow, which at that time was under Austrian rule. In 1891, she went to Paris to continue her studies at the Sorbonne where she obtained Licenciateships in Physics and the Mathematical Sciences. She met Pierre Curie, Professor in the School of Physics in 1894 and in the following year they were married. She succeeded her husband as Head of the Physics Laboratory at the Sorbonne, gained her Doctor of Science degree in 1903, and following the tragic death of Pierre Curie in 1906, she took his place as Professor of General Physics in the Faculty of Sciences, the first time a woman had held this position. She was also appointed Director of the Curie Laboratory in the Radium Institute of the University of Paris, founded in 1914.

The importance of Mme. Curie's work is reflected in the numerous awards bestowed on her. She received many honorary science, medicine and law degrees and honorary memberships of learned societies throughout the world. Together with her husband, she was awarded half of the Nobel Prize for Physics in 1903, for their study into the spontaneous radiation discovered by Becquerel, who was awarded the other half of the Prize. In 1911 she received a second Nobel Prize, this time in Chemistry, in recognition of her work in radioactivity. She also received, jointly with her husband, the Davy Medal of the Royal Society in 1903 and, in 1921, President Harding of the United States, on behalf of the women of America, presented her with one gram of radium in recognition of her service to science.

Source: https://www.nobelprize.org/prizes/physics/1903/marie-curie/biographical/

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ELIZABETH BLACKWELL

The first woman in America to receive a medical degree, Elizabeth Blackwell championed the participation of women in the medical profession and ultimately opened her own medical college for women.

Born near Bristol, England on February 3, 1821, Blackwell was the third of nine children of Hannah Lane and Samuel Blackwell, a sugar refiner, Quaker, and anti-slavery activist. Blackwell's famous relatives included brother Henry, a well-known abolitionist and women's suffrage supporter who married women's rights activist Lucy Stone; Emily Blackwell, who followed her sister into medicine; and sister-in-law Antoinette Brown Blackwell, the first ordained female minister in a mainstream Protestant denomination.

In 1851, Dr. Blackwell returned to New York City, where discrimination against female physicians meant few patients and difficulty practicing in hospitals and clinics. With help from Quaker friends, Blackwell opened a small clinic to treat poor women; in 1857, she opened the New York Infirmary for Women and Children with her sister Dr. Emily Blackwell and colleague Dr. Marie Zakrzewska. Its mission included providing positions for women physicians. During the Civil War, the Blackwell sisters trained nurses for Union hospitals.

In 1868, Blackwell opened a medical college in New York City. A year later, she placed her sister in charge and returned permanently to London, where in 1875, she became a professor of gynecology at the new London School of Medicine for Women. She also helped found the National Health Society and published several books, including an autobiography, *Pioneer Work in Opening the Medical Profession to Women* (1895).

Source: https://www.womenshistory.org/education-resources/biographies/elizabeth-blackwell

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JANE GOODALL

The most famous primate scientist in history, Jane Goodall was renowned for her work with chimpanzees and as a champion of animal rights. And Goodall wasn't just working in a lab; she climbed trees and mimicked the behavior of chimps in Tanzania to gain their trust and study them in their natural habitat.

Jane Goodall, in full **Dame Jane Goodall**, original name **Valerie Jane Morris-Goodall**, (born April 3, 1934, London, England), British ethologist, known for her exceptionally detailed and long-term research on the chimpanzees of Gombe Stream National Park in Tanzania.

In 1977, Jane founded the Jane Goodall Institute, which continues to support the research at Gombe. With 31 offices around the world, Dr. Jane and the Institute are widely recognized for effective community-centered conservation and development programmes in Africa and the protection of wild chimpanzees in Africa's Tchimpounga and Chimp Eden sanctuaries.

In 1991, after meeting with a group of Tanzanian teenagers to discuss community problems, Jane created Roots & Shoots. This programme is dedicated to inspiring young people to take action in their communities and it has since grown to include approximately 150,000 individuals in nearly 100 countries.

Jane continues her work today by travelling an average of 300 days per year speaking in packed auditoriums, school gymnasiums, and conference centres about the threats facing chimpanzees, other environmental crises, and her reasons for hope that we will ultimately solve the problems that we have imposed on the earth.

Everywhere she goes, Jane urges audiences to recognize their personal power and responsibility to effect positive change through consumer action, lifestyle change and activism.

Sources:

https://www.britannica.com/biography/Jane-Goodall

https://www.janegoodall.be/

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MAE J. JAMISON

Mae C. Jemison is the first African-American female astronaut. In 1992, she became the first black woman in space when as a crew member on the space ship Endeavour. Before entering the space program, she was a medical doctor who served with the Peace Corps in Sierra Leone and Liberia.

As a doctor, engineer, and NASA astronaut, Mae Jemison has always reached for the stars. In 1992, Jemison became the first African American woman to travel in space. She has also written several books and appeared on many television programs including an episode of *Star Trek: The Next Generation*. In addition to her many awards, Jemison has been inducted into the National Women's Hall of Fame and the International Space Hall of Fame.

Mae Carol Jemison was born on October 17, 1956 in Decatur, Alabama. The youngest of three children, her mother was an elementary school teacher and her father was a maintenance supervisor. A few years after she was born, Jemison and her family moved to Chicago, Illinois. In addition to her love for dance, Jemison knew that she wanted to study science at a very young age. Jemison grew up watching the Apollo airings on TV, but she was often upset that there were no female astronauts. However, Jemison was inspired by African American actress Nichelle Nichols who played Lieutenant Uhura on the Star Trek television show. Jemison was determined to one day travel in space. In 1973, she graduated from Morgan Park High School when she was 16 years old. Once she graduated, Jemison left Chicago to attend Stanford University in California.

Currently, Jemison is leading the 100 Year Starship project through the United States Defense Advanced Research Projects Agency (DARPA). This project works to make sure human space travel to another star is possible within the next 100 years. She also serves on the Board of Directors for many organizations including; the Kimberly-Clark Corp., Scholastic, Inc., Valspar Corp., Morehouse College, Texas Medical Center, Texas State Product Development and Small Business Incubator, Greater Houston Partnership Disaster Planning and Recovery Task Force, and the National Institute of Biomedical Imaging and Bioengineering. Jemison is a member of the National Academy of Sciences' Institute of Medicine, and has been inducted into the National Women's Hall of Fame, National Medical Association Hall of Fame and Texas Science Hall of Fame. She has received multiple awards and honorary degrees including the National Organization for Women's Intrepid Award and the Kilby Science Award. She currently lives in Houston, Texas.

Sources: https://www.womenshistory.org/education-resources/biographies/mae-jemison

https://www.globalcitizen.org/en/content/17-top-female-scientists-who-have-changed-the-worl/

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JENNIFER DOUDNA

Jennifer Doudna is one of the most culturally significant scientists studying today. She helped developed CRISPR, the genetic-engineering method that could allow for "designer babies" but also for the eradication or treatment of sickle cell anemia, cystic fibrosis, Huntington's disease, and HIV. She is a professor at UC Berkeley.

Jennifer Doudna is a Nobel Laureate in Chemistry, and a Professor of Biochemistry, Biophysics and Structural Biology. Her research focuses on RNA as it forms a variety of complex globular structures, some of which function like enzymes or form functional complexes with proteins. Her lab's research into RNA biology led to the discovery of CRISPR-Cas9 as a tool for making targeted changes to the genome. In bacteria, CRISPR systems preserve invading genetic material and incorporate it into surveillance complexes to achieve adaptive immunity. Crystal structures of diverse Cas9 proteins reveal RNA-mediated conformational activation. Current research in the Doudna lab focuses on discovering and determining the mechanisms of novel CRISPR-Cas and associated proteins; developing genome editing tools for use in vitro, in plants, and in mammals; and developing anti-CRISPR agents. New discoveries in this field continue at a rapid pace, revealing a technology that has widespread applications in many areas of biology.

Sources:

https://www.globalcitizen.org/en/content/17-top-female-scientists-who-have-changed-the-worl/

https://vcresearch.berkeley.edu/faculty/jennifer-doudna

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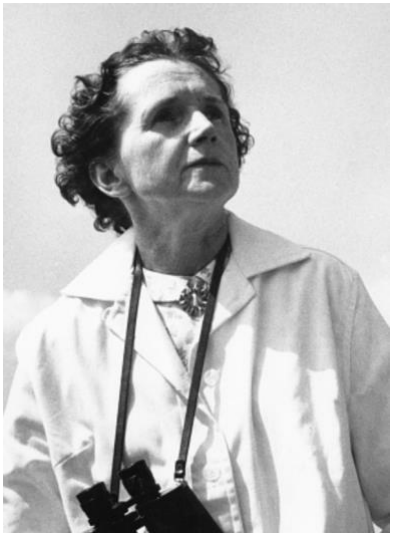
KATHERINE FREESE



Freese is a trailblazing modern scientist who studies dark matter, including studying "dark stars" in the universe, something that has never been observed directly by a human. She's the Director of Nordita, an institute for theoretical physics in Stockholm.

Freese has contributed to early research on dark matter and dark energy. She was one of the first to propose ways to discover dark matter.[4] Her idea of indirect detection in the Earth is being pursued by the IceCube Neutrino Observatory experiment,[5] and the "wind" of dark matter particles felt as the Earth orbits the Milky Way (work with David Spergel) is being searched for in worldwide experiments. Her work decisively ruled out MACHO (Massive compact halo object) dark matter in favor of WIMPs (weakly interacting massive particles).[6] She has proposed a model known as "Cardassian expansion," in which dark energy is replaced with a modification of Einstein's equations.[7] Recently she proposed a new theoretical type of star, called a dark star, powered by dark matter annihilation rather than fusion.[8]

Freese has also worked on the beginnings of the universe, including the search for a successful inflationary theory to kick off the Big Bang. Her natural inflation model [9] is a theoretically well-motivated variant of inflation; it uses axionic-type particles to provide the required flat potentials to drive the expansion. In 2013, observations made by the European Space Agency's Planck Satellite show that the framework of natural inflation matches the data.[10] She has studied the Ultimate fate of the universe, including the fate of life in the universe.[11]"

Freese has served on the board of the Kavli Institute for Theoretical Physics in Santa Barbara and the board of the Aspen Center for Physics. From 2008-2012 she was a councilor and member of the executive committee of the American Physical Society, and from 2005-2008 she was a member of the Astronomy and Astrophysics Advisory Committee (AAAC). Currently she serves on the board of the Oskar Klein Centre for Cosmoparticle Physics in Stockholm.

Sources: https://www.globalcitizen.org/en/content/17-top-female-scientists-who-have-changed-the-worl/

https://en.wikipedia.org/wiki/Katherine_Freese

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RACHEL CARSON

In the 1960s, one environmental scientist's voice rose above the rest to become central to American politics, culture, and foreign policy: Rachel Carson's. Her book, "Silent Spring," warned of the dangers of pesticides and chemicals to humans, plants, and animals, and was a landmark in the nation's environmental history.

Source: https://www.globalcitizen.org/en/content/17-top-female-scientists-who-have-changed-the-worl/

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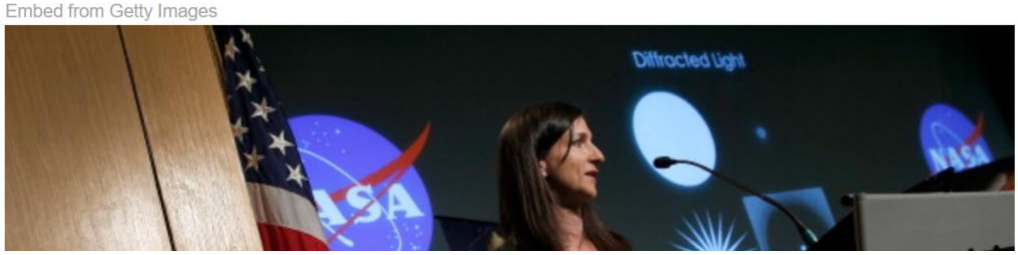
MARIA GOEPPERT MAYER

A German immigrant to the US who studied at Johns Hopkins during the Great Depression, Maria Goeppert Mayer, born in 1906, persisted in her studies even when no university would employ her and went onto become a chemical physicist. Her most famous contribution to modern physics is discovering the nuclear shell of the atomic nucleus, for which she won the Nobel Prize in 1963.

Embed from Getty Images



Source: https://www.globalcitizen.org/en/content/17-top-female-scientists-who-have-changed-the-worl/

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SARA SEAGER

By the time women were being trained as university scientists, the "solar system" had been pretty well-mapped. But Sara Seager, born in 1971, has discovered 715 planets in her time working with the Kepler Space Telescope, a remarkable contributor to the modern understanding of space.

Source: https://www.globalcitizen.org/en/content/17-top-female-scientists-who-have-changed-the-worl/

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ROSALIND FRANKLIN

Rosalind Franklin, born in 1920, was a British biophysicist known for revolutionary work discovering DNA, as well as understanding X-rays and molecular structure.

Embed from Getty Images

Franklin's scientific achievements, both in coal chemistry and virus structure research were considerable. Her peers in those fields acknowledged this during her life and after her death. But it is her role in the discovery of DNA structure that has garnered the most public attention. Crick, Watson, and Wilkins shared the 1962 Nobel Prize for Physiology or Medicine for their work on the structure of DNA. None gave Franklin credit for her contributions at that time. Franklin's work on DNA may have remained a quiet footnote in that story had Watson not caricatured her in his 1968 memoir, *The Double Helix*. There he presented Franklin as "Rosy," a bad-tempered, arrogant bluestocking who jealously guarded her data from colleagues, even though she was not competent to interpret it. His book proved very popular, even though many of those featured in the story--including Crick, Wilkins, and Linus Pauling--protested Watson's treatment of Franklin, as did many reviewers. In 1975, Franklin's friend Anne Sayre published a biography in angry rebuttal to Watson's account, and Franklin's role in the discovery became better known. Numerous articles and several documentaries have attempted to highlight her part in "the race for the double helix," often casting her as a feminist martyr, cheated of a Nobel prize both by misogynist colleagues and by her early death. However, as her second biographer, Brenda Maddox, has noted, this too is caricature, and unfairly obscures both a brilliant scientific career and Franklin herself.

Source: https://www.globalcitizen.org/en/content/17-top-female-scientists-who-have-changed-the-worl/

https://profiles.nlm.nih.gov/spotlight/kr/feature/biographical-overview

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Barbara McCLINTOCK

Barbara McClintock won the Nobel Prize in 1983 for her studies of the genetic makeup of corn, and specifically, her discovery of genetic transposition, or the ability of genes to change position on the chromosome.

Embed from Getty Images

Barbara McClintock almost didn't go to college. She was a talented student, but her mother believed a college degree would harm her chances of marriage and vetoed her plan to go to Cornell.

Genetics as a discipline was still new in the 1920s; Cornell offered only one undergraduate course. But McClintock took to it immediately, conceiving a lifelong interest in the field of cytogenetics – the study of chromosomes and their genetic expression.

Sources:

https://www.nobelprize.org/womenwhochangedscience/stories/barbara-mcclintock

https://www.globalcitizen.org/en/content/17-top-female-scientists-who-have-changed-the-worl/

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RITA LEVI-MONTALCINI

The Italian neurologist Rita Levi-Montalcini won a Nobel in 1986 for discovering what is known as Nerve growth factor. According to the New York Times, her work on nerve growth led to discoveries on how that growth can go wrong in diseases like dementia and cancer.

Source: https://www.globalcitizen.org/en/content/17-top-female-scientists-who-have-changed-the-worl/

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ANDREA GHEZ

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Photo: Annette Buhl

Andrea Ghez
The Nobel Prize in Physics 2020

Born: 16 June 1965, New York, NY, USA

Affiliation at the time of the award: University of California, Los Angeles, CA, USA

Prize motivation: "for the discovery of a supermassive compact object at the centre of our galaxy"

Prize share: 1/4

Work

A black hole is a supermassive compact object with a gravitational force so large that nothing, not even light, can escape from it. Since nothing, not even light, can escape black holes, they can only be observed by the radiation and the movement of nearby objects. Since the 1990s, Andrea Ghez and Reinhard Genzel with their respective research teams, have developed and refined techniques for studying the movement of stars. Observations of stars in the area around Sagittarius A* in the middle of our galaxy, the Milky Way, revealed a super massive black hole.

Source: https://www.nobelprize.org/prizes/physics/2020/ghez/facts/

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ESTHER DUFLO

© Nobel Media. Photo: A. Mahmoud

Esther Duflo
The Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel 2019

Born: 25 October 1972, Paris, France

Affiliation at the time of the award: Massachusetts Institute of Technology (MIT), Cambridge, MA, USA

Prize motivation: "for their experimental approach to alleviating global poverty"

Prize share: 1/3

Esther Duflo was born in Paris, where her mother was a pediatrician and her father a professor of mathematics. After studying history and economics at the École Normale Superieure and elsewhere, she completed her doctorate in economics at the Massachusetts Institute of Technology (MIT) in 1999. Aside from a leave at Princeton University, she has continued to work at MIT. Esther Duflo married her research colleague, Abhijit Banerjee, with whom she also shared the Economics Prize.

One of humanity's most urgent issues is the reduction of global poverty, in all its forms. Abhijit Banerjee, Esther Duflo, and Michael Kremer have introduced a new approach to obtaining reliable answers about the best ways to fight global poverty. It involves dividing this issue into smaller, more manageable, questions. Since the mid-1990s, they have been able to test a range of interventions in different areas using field experiments, for example for improving educational outcomes or child health.

Source: https://www.nobelprize.org/prizes/economic-sciences/2019/duflo/facts/

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SOFIA KOVALEVSKAIA

An extraordinary woman, Sofia Kovalevskaya (also known as Sonia Kovalevsky) was not only a great mathematician, but also a writer and advocate of women's rights in the 19th century. It was her struggle to obtain the best education available which began to open doors at universities to women. In addition, her ground-breaking work in mathematics made her male counterparts reconsider their archaic notions of women's inferiority to men in such scientific arenas.

Sofia Krukovsky Kovalevskaya was born in 1850. As the child of a Russian family of minor nobility, Sofia was raised in plush surroundings. She was not a typically happy child, though. She felt very neglected as the middle child in the family of a well admired, first-born daughter, Anya, and of the younger male heir, Fedya. For much of her childhood she was also under the care of a very strict governess who made it her personal duty to turn Sofia into a young lady. As a result, Sofia became fairly nervous and withdrawn--traits which were evident throughout her lifetime (Perl 127-128).

Sofia's exposure to mathematics began at a very young age. She claims to have studied her father's old calculus notes that were papered on her nursery wall in replacement for a shortage of wallpaper. Sofia credits her uncle Peter for first sparking her curiosity in mathematics. He took an interest in Sofia and made time to discuss numerous abstractions and mathematical concepts with her (Rappaport 564). When she was fourteen years old she taught herself trigonometry in order to understand the optics section of a physics book that she was reading. The author of the book and also her neighbor, Professor Tyrtov, was extremely impressed with her capabilities and convinced her father to allow her to go off to school in St. Petersburg to continue her studies (Rappaport 564).

Sofia's father decided to put a stop to her mathematics lessons but she borrowed a copy of Bourdon's *Algebra Course* which she read at night when the rest of the household was asleep [62]:-

> *Since I was under my governess's strict surveillance all day long, I was forced to practice some cunning in this matter. At bedtime I used to put the book under my pillow and then, when everyone was asleep, I would read the night through under the dim light of the icon-lamp or the night lamp. Under such circumstances, of course, I did not dare dream of continuing the systematic study of my favourite subject. My mathematical knowledge would likely have remained confined for a long time, to the contents of Bourdon's 'Algebra' if I had not been aided by the following incident, which motivated my father to reassess his views on my education to some degree.*

Sources:

https://mathwomen.agnesscott.org/women/kova.htm

https://mathshistory.st-andrews.ac.uk/Biographies/Kovalevskaya/

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HYPATHIA

Hypatia, (born c. 355 CE—died March 415, Alexandria), mathematician, astronomer, and philosopher who lived in a very turbulent era in Alexandria's history. She is the earliest female mathematician of whose life and work reasonably detailed knowledge exists.

Hypatia was the daughter of Theon of Alexandria, himself a mathematician and astronomer and the last attested member of the Alexandrian Museum (*see* Researcher's Note: Hypatia's birth date). Theon is best remembered for the part he played in the preservation of Euclid's *Elements*, but he also wrote extensively, commenting on Ptolemy's *Almagest* and *Handy Tables*. Hypatia continued his program, which was essentially a determined effort to preserve the Greek mathematical and astronomical heritage in extremely difficult times. She is credited with commentaries on Apollonius of Perga's *Conics* (geometry) and Diophantus of Alexandria's *Arithmetic* (number theory), as well as an astronomical table (possibly a revised version of Book III of her father's commentary on the *Almagest*). These works, the only ones she is listed as having written, have been lost, although there have been attempts to reconstruct aspects of them. In producing her commentaries on Apollonius and Diophantus, she was pushing the program initiated by her father into more recent and more difficult areas.

Source: https://www.britannica.com/biography/Hypatia

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ELINOR OSTROM

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Photo: U. Montan

Elinor Ostrom
The Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel 2009

Born: 7 August 1933, Los Angeles, CA, USA

Died: 12 June 2012, Bloomington, IN, USA

Affiliation at the time of the award: Indiana University, Bloomington, IN, USA; Arizona State University, Tempe, AZ, USA

Prize motivation: “for her analysis of economic governance, especially the commons”

Prize share: 1/2

Life

Elinor Clair Awan was born in Los Angeles, California in the United States, and grew up in a family of simple means. She studied political science at the University of California Los Angeles, where she also received her PhD in 1965. She later went on to work at Indiana University in Bloomington. Ostrom has also been affiliated with Arizona State University in Tempe and Virginia Tech. She married fellow political scientist Vincent Ostrom in 1963.

Work

It was long unanimously held among economists that natural resources that were collectively used by their users would be over-exploited and destroyed in the long-term. Elinor Ostrom disproved this idea by conducting field studies on how people in small, local communities manage shared natural resources, such as pastures, fishing waters, and forests. She showed that when natural resources are jointly used by their users, in time, rules are established for how these are to be cared for and used in a way that is both economically and ecologically sustainable.

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AMELIA EARHART

- **January 3, 1921** – Began flying lessons with Neta Snook
- **July 1921** – Bought first plane, the Kinner Airster (named "The Canary")
- **October 22, 1922** – Broke women's altitude record when she rose to 14,000 feet
- **June 17-18, 1928** – First woman to fly across the Atlantic; 20hrs 40min (Fokker F7, Friendship)
- **Summer 1928** – Bought an Avro Avian, a small English plane famous because Lady Mary Heath, Britain's foremost woman pilot, had flown it solo from Capetown, South Africa, to London
- **Fall 1928** – Published book, *20 Hours 40 Minutes*, toured, and lectured; became aviation editor of Cosmopolitan magazine
- **August 1929** – Placed third in the First Women's Air Derby, also known as the Powder Puff Derby; upgraded from her Avian to a Lockheed Vega
- **Fall 1929** – Elected as an official for National Aeronautic Association and encouraged the Federation Aeronautique Internationale (FAI) to establish separate world altitude, speed, and endurance records for women
- **June 25, 1930** – Set women's speed record for 100 kilometers with no load and with a load of 500 kilograms
- **July 5, 1930** – Set speed record for of 181.18mph over a 3K course
- **September 1930** – Helped to organize and became vice president of public relations for new airline, New York, Philadelphia, and Washington Airways
- **April 8, 1931** – Set woman's autogiro altitude record with 18,415 feet (in a Pitcairn autogiro)
- **May 20-21, 1932** – First woman to fly solo across the Atlantic; 14 hrs 56 min (it was also the 5th anniversary of Lindberg's Atlantic flight; awarded National Geographic Society's gold medal from President Herbert Hoover; Congress awarded her the Distinguished Flying Cross; wrote The *Fun of It* about her journey

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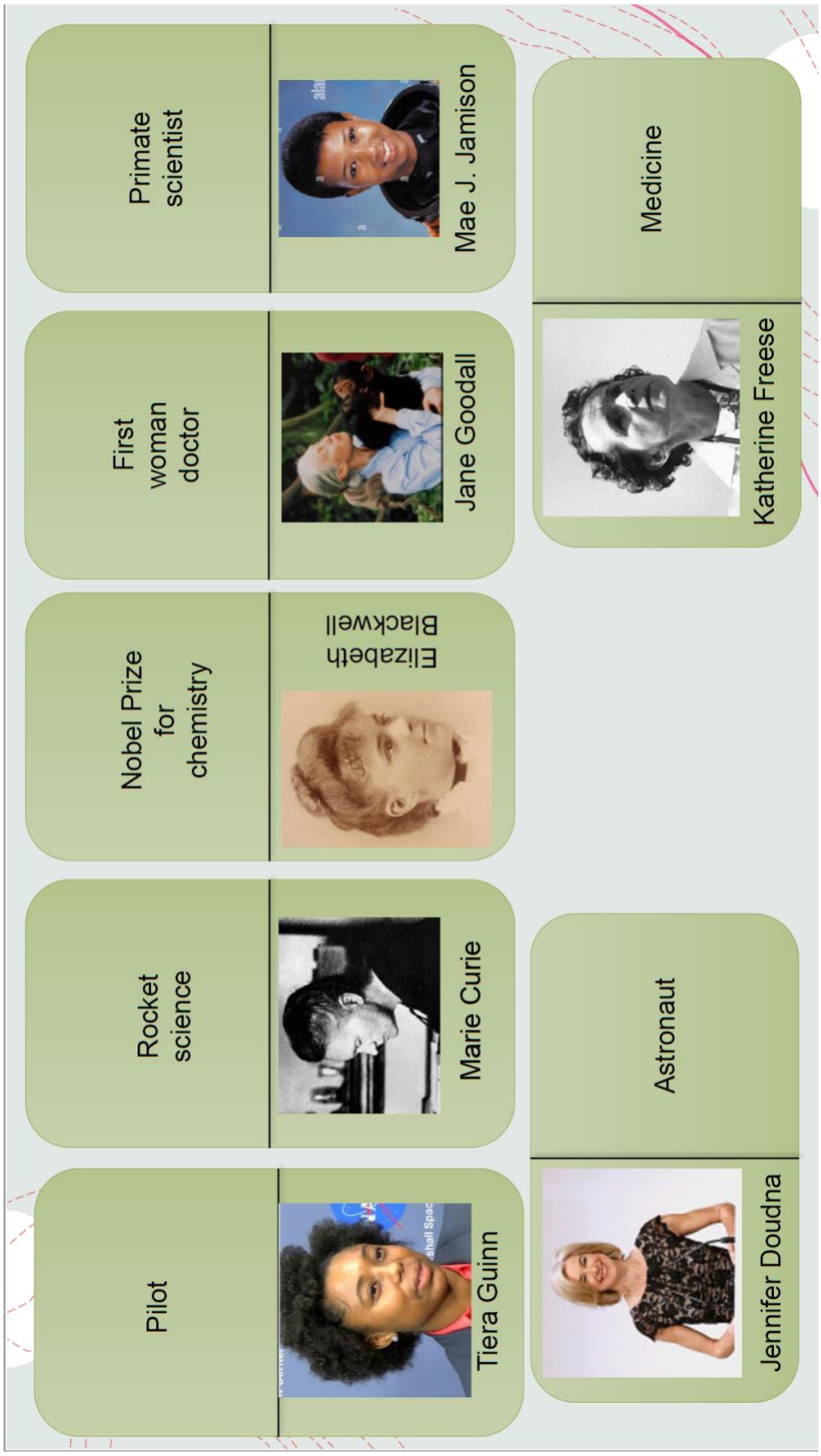
- **August 24-25, 1932** – First woman to fly solo nonstop coast to coast; set women's nonstop transcontinental speed record, flying 2,447.8 miles in 19hrs 5min
- **Fall 1932** – Elected president of the Ninety Nines, a new women's aviation club which she helped to form
- **July 7-8, 1933** – Broke her previous transcontinental speed record by making the same flight in 17hrs 7min
- **January 11, 1935** – First person to solo the 2,408-mile distance across the Pacific between Honolulu and Oakland, California; also first flight where a civilian aircraft carried a two-way radio
- **April l9 – 20, 1935** – First person to fly solo from Los Angeles to Mexico City; 13hrs 23min
- **May 8, 1935** – First person to fly solo nonstop from Mexico City to Newark; 14hrs 19min
- **March 17, 1937** – Amelia and her navigator, Fred Noonan, along with Captain Harry Manning and stunt pilot Paul Mantz, fly the first leg of the trip from Oakland, California, to Honolulu, Hawaii, in 15 hours and 47 minutes
- **June 1, 1937** – Began flight around the world June 1937; first person to fly from the Red Sea to India

Source: https://ameliaearhart.com/achievements/

ANNEXE 3: CARTES DOMINO



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Barbara McClintock

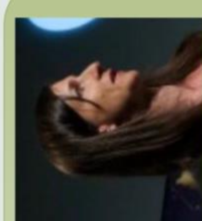
Biophysics

Rosalind Franklin

Astronomy

Sara Seager

Chemical physicist



Maria Goeppert Mayer

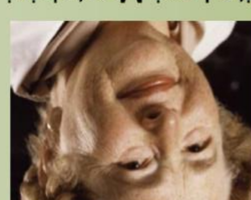
Environment

Rachel Carson

Physics (dark matter)

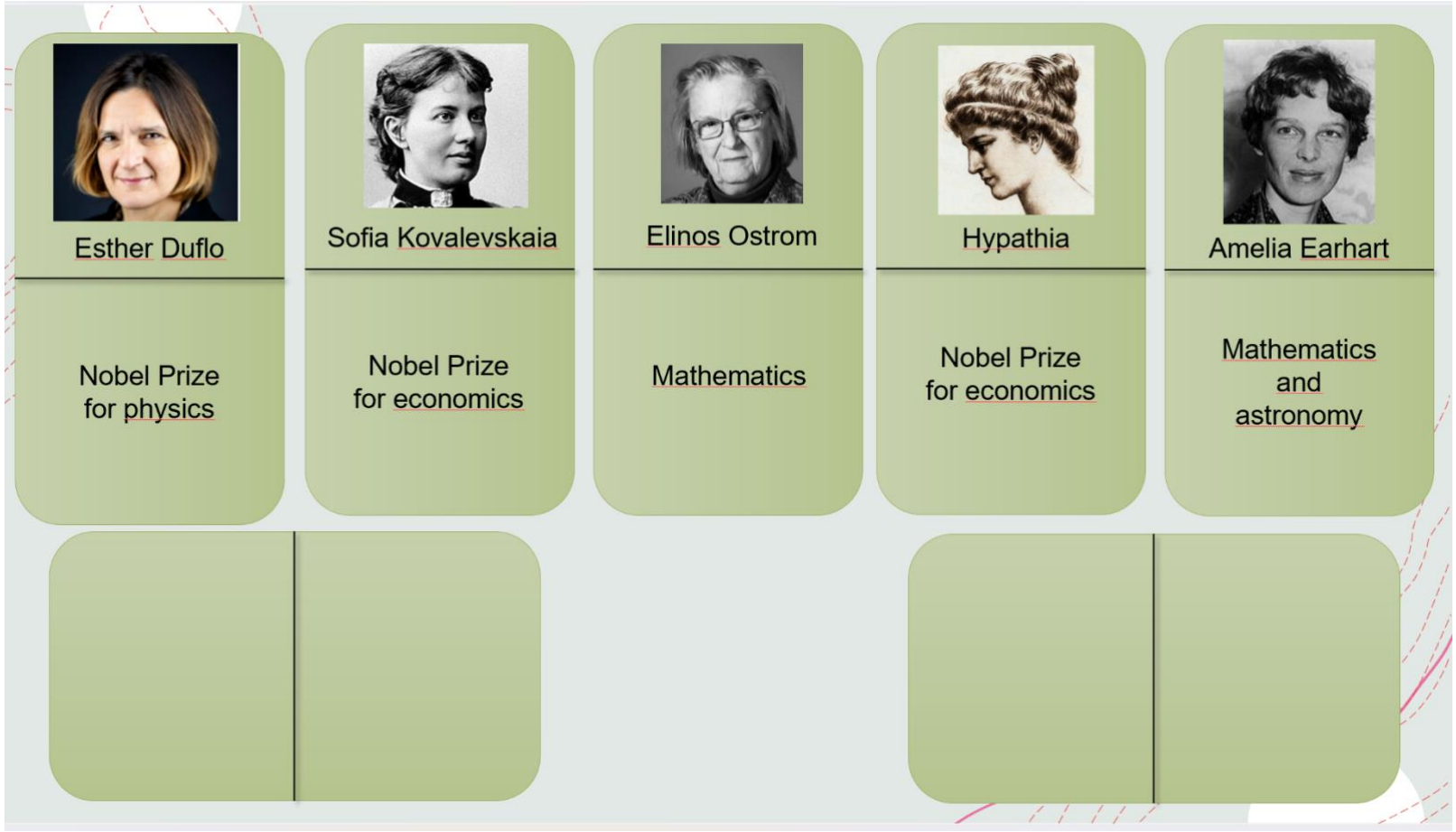
Andrea Ghez

Neurology



Rita Levi-Montalcini

Genetics



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