FOCUS ON

The world of STEAM

ANEP | CONSEJO DIRECTIVO CENTRAL | DIRECCIÓN DE POLÍTICAS LINGÜÍSTICAS

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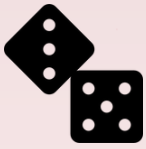

PLAY A GAME

SEARCH THE WEB


THINK


YOUR TIME


PROJECT


EXTRA HELP

1 Introduction to STEAM and technological innovations

Get in pairs and **discuss** what each letter in STEAM stands for.

S

T

E

A

M

Think of examples of how these fields can work together.
For example, *how does technology benefit from engineering?*
How can art be integrated into scientific research?

Share your ideas with the rest of the class.

Write these key terms next to the correct definition.

· artificial intelligence (AI) · automation · blockchain · collaboration ·
· cybersecurity · innovation · inquiry · interdisciplinary · programming ·
· prototype · robot · sensor ·

1 **A new idea or method:**	
2 **Combining different subjects:**	
3 **Asking questions and investigating:**	
4 **Working together:**	
5 **A first model of something:**	
6 **Machines that can simulate human intelligence:**	
7 **A secure system for recording information:**	
8 **Protecting computer systems from attacks:**	
9 **Using machines to do tasks automatically:**	
10 **A machine that can do tasks automatically:**	
11 **A device that detects something (e.g., light, temperature):**	
12 **Giving instructions to a computer:**	

Read the article and **fill in the blanks** (1 - 5) with the appropriate sentences from the options provided (a - e)

a. Some help in hospitals, others explore space, doing jobs that are too dangerous or boring for people.

b. It's used to protect important data, like money and health records.

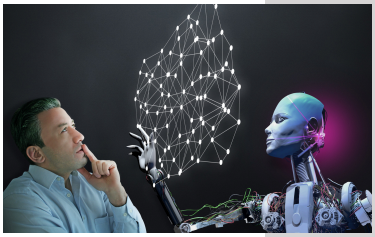
c. It helps us discover new things and solve problems.

d. Ready to be part of the STEAM adventure?

e. Imagine a computer that thinks like a person.

THE COOL FUTURE OF STEAM

Shaping tomorrow today



1. _____ Welcome to the future! Science, Technology, Engineering, Arts, and Mathematics—together known as STEAM—are changing our world in incredible ways. Let's dive into some of the coolest trends in STEAM today.

Blockchain is a super-secure way to keep information safe, like a digital notebook that hackers can't change. 2. _____ In STEAM, collaboration is key. Working together with people who have different skills helps solve big problems and create amazing things. Your unique talents can make a huge difference.

Living online means we need to protect our information. Cybersecurity experts stop hackers from stealing our data, keeping our digital lives safe and private. Innovation means creating new things, and STEAM encourages us to think of new ideas and make them real, whether it's a new app, a cool gadget, or an artwork.

Curiosity drives STEAM through inquiry – asking questions and searching for answers. 3. _____ Interdisciplinary projects mix different fields like science, art, and engineering, leading to innovative and effective solutions.

Programming is how we tell computers what to do. By programming, you can create games, apps, and even control robots. It's like writing a recipe for a computer. Before a new product is made, it starts as a prototype. This first model is tested and improved until it's perfect.

Robots are amazing machines that do tasks for us. 4. _____ And sensors help these machines understand their surroundings, detecting light, temperature, and movement – like the eyes and ears of technology.

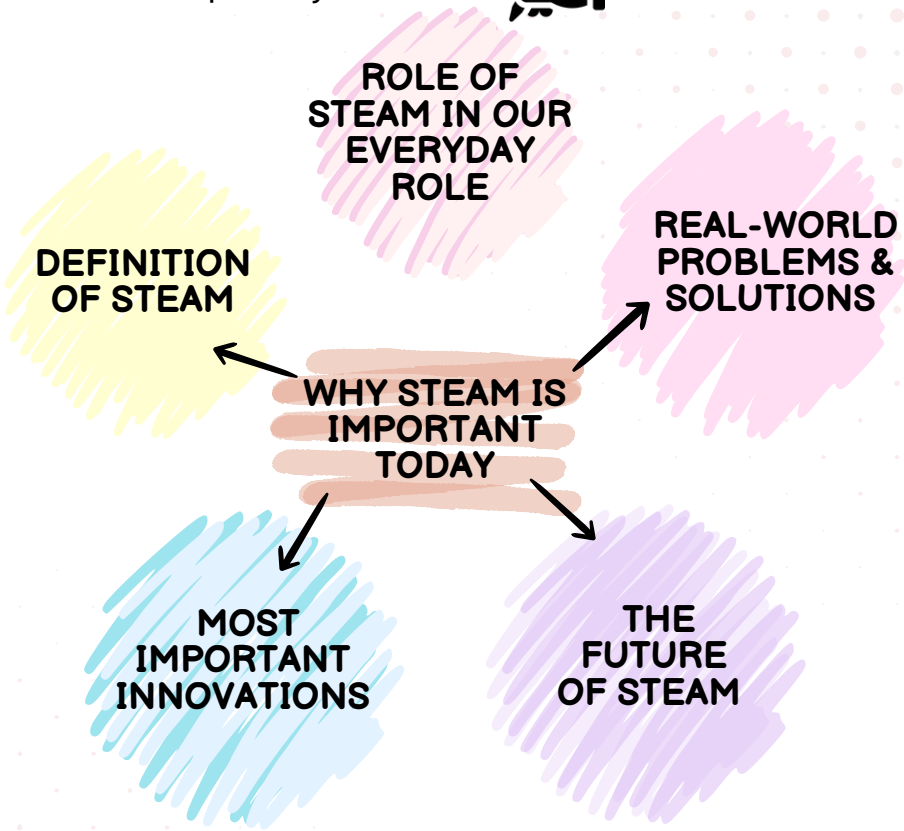
So, there you have it! STEAM is full of exciting possibilities for you to explore. Whether you're interested in AI, programming, or inventing new things, STEAM has something for you. Get curious, start creating and join the amazing future of STEAM!

5. _____ The future is in your hands!

Get in small groups and **discuss** these questions.

1. How do you think AI can change our daily lives in the future?
2. Can you think of a project that would benefit from an interdisciplinary approach?
3. What are some potential dangers if cybersecurity is not strong enough?

Complete the mind map with your ideas.



EN **Imagine** you are a STEAM expert and you have been invited to give a talk about the future of technology. **Write** a script for your talk including:

- An introduction to yourself and your area of expertise. For example, *I work as a web designer*.
- A description of a current project you are working on. For example, *I am currently developing an app*.
- A prediction about what will happen in the field of technology in the next 10 years. For example, *In the next 10 years, everything will be automated*.
- Some advice for young people who want to pursue a career in STEAM. For example, *For those of you who want to pursue this career, you should explore new paths to using technology*.
- A question-and-answer session. For example, *How do you prepare for the future?*.

Considering STEAM and technological innovations, **answer** the following questions by choosing the most appropriate option.

1. a What should students do to be part of the STEAM adventure?
   b Students _____ ***(should/could/must)*** get curious, start creating, and join the amazing future of STEAM.

2. a How can collaboration in STEAM projects help solve problems?
   b By working together, people _____ ***(should/could/might)*** combine their different skills to find innovative and effective solutions.

3. a What dangers _____ ***(should/could/must)*** we be aware of regarding cybersecurity?
   b We _____ ***(should/could/must)*** ensure that cybersecurity is strong enough to protect our digital information from hackers.

4. a What types of tasks _____ ***(should/could/will)*** robots be able to do in the future?
   b Robots _____ ***(should/could/will)*** be able to do jobs that are too dangerous or boring for people, such as helping in hospitals or exploring space.

5. a How _____ ***(should/could/will)*** students prepare for future careers through STEAM education?
   b STEAM education _____ ***(should/could/will)*** help students develop the skills and knowledge they need for a wide range of future careers.

Go back to the mind map and use your notes to **write** a short essay on why STEAM is important today.

Use the SOS box to help you.

Paragraph 1: INTRODUCTION
- **Define STEAM.**
- **Briefly explain its importance.**

Paragraphs 2 & 3: BODY
- **How STEAM encourages innovation.**
- **Examples of problem-solving in STEAM.**
- **Preparation for future careers through STEAM education.**

Paragraph 4: CONCLUSION
- **Summarize key points.**
- **Emphasize the significance of STEAM for the future.**

SOS BOX

Get in small groups and **create** a STEAM game containing different STEAM-related terms or concepts.

Examples of terms/concepts: artificial intelligence, automation, blockchain, collaboration, cybersecurity, innovation, inquiry, interdisciplinary, programming, prototype, robot, sensor, etc.

Think about how to play the game, the materials needed, instructions, etc.

Camila and Inés are discussing future options. **Read** the dialogue and **answer** the questions.
Then, **get in pairs** and **perform** the dialogue.

1. How does Inés describe the integration of different fields within STEAM?
2. What career is Inés considering? Why does she find it important?
3. What specific areas of technology interest Camila? How does she envision their impact?


Hey Inés, have you thought about what career you want to pursue after high school?

Yeah, I've been thinking a lot about it. I'm really interested in something that combines science and technology. How about you?



Same here! I'm fascinated by how technology can solve real-world problems. I was reading about STEAM and how it integrates different fields like science, technology, engineering, arts and mathematics. Do you know what each letter in STEAM stands for?

Of course! S stands for Science, T for Technology, E for Engineering, A for Arts, and M for Mathematics. It's amazing how these fields can work together. For example, engineering relies heavily on science and mathematics to design and build structures, while technology often needs creative input from the arts to improve user experience.



Exactly! I read about how art can be integrated into scientific research to visualize complex data. And think about how programming and cybersecurity are essential for developing new technologies safely.

That's so true. I'm considering a career in cybersecurity. With so much information being stored online, protecting data is becoming more important than ever.



That's a great choice. I'm leaning towards robotics and automation. Imagine creating robots that can help in hospitals or explore space!

Both fields sound exciting! Let's keep exploring and learning more about STEAM. The future is full of possibilities.



Absolutely!

Project Design a STEAM-based technological innovation

1. **Work in small groups** to **brainstorm** and **design** a technological innovation that integrates elements of STEAM.
2. **Create** a poster or digital presentation explaining your innovation, how it works and its potential impact.
3. **Present** your project to the class.

Project planning

Innovation concept

- How do you describe your technological innovation?

STEAM integration

- How does your project incorporate Science, Technology, Engineering, Arts and Mathematics?

Functionality

- How does your innovation work?
- What problem does it solve?

Potential impact

- Who will benefit from your innovation?
- How will it make a difference?

Presentation checklist

- [ ] Introduction of the team and project.
- [ ] Explanation of the innovation concept.
- [ ] Demonstration or visual representation.
- [ ] Discussion of STEAM integration.
- [ ] Explanation of functionality and impact.
- [ ] Conclusion.

2 scientific inquiry and experimentation!

Have you ever wondered why the sky is blue or how plants grow? Science is all about asking questions and finding answers through experiments.

An experiment is a controlled test where we change one thing, the variable, and see how it affects something else.

Read part of an article about *The Stanford Marshmallow Experiment* and **choose** the correct option.

1 **In the Stanford Marshmallow Experiment, what were the children offered in exchange for waiting?**

- **a** • A single, larger reward.
- **b** • Two small rewards if they waited.
- **c** • No reward.

2 **What aspect of the experiment did the researcher change to test their hypothesis?**

- **a** • The type of reward offered.
- **b** • The age of the children participating.
- **c** • The length of time the children had to wait.

3 **According to the study, what was observed about children who waited longer for the reward?**

- **a** • They tended to have lower scores on standardized tests.
- **b** • They tended to have better outcomes in life, such as higher education levels.
- **c** • They showed signs of impatience and frustration.

1 ☐ 2 ☐ 3 ☐

THE STANFORD *Marshmallow* EXPERIMENT

The Stanford Marshmallow Experiment was a series of studies on delayed gratification conducted in the late 1960s and early 1970s by psychologist Walter Mischel. The main question being answered was whether a child's ability to delay gratification could predict future success.

In the experiment, each child was offered a choice between one small but immediate reward (such as a marshmallow or a cookie) or two small rewards if they waited for a certain period. The researcher would leave the room during the waiting period, and the child was observed to see if they could resist the immediate reward.

The independent variable was the amount of time the children had to wait before receiving the second reward, as this was the one thing that changed in the experiment. The dependent variable was whether the children chose to wait for the larger reward or took the immediate one. This behavior was what was measured or observed throughout the study.

From the experiment, it was learned that children who were able to wait longer for the reward tended to have better life outcomes. These outcomes were measured by factors such as higher SAT scores, greater educational attainment, and overall better life success in areas like health, income and relationships.

Read the text again and **answer.**

1. What question was being answered? (This is the **hypothesis**)
2. What was the one thing changed in the experiment? (This is the **independent variable**)
3. What was measured or observed? (This is the **dependent variable**)
4. What was learned from the experiment? (This is the **conclusion**)

Did you know?

Delayed gratification is the ability to resist the temptation of an immediate reward in order to wait for a better, often larger reward in the future.

Inés and Guidaí need to design a simple experiment and write a report on it. Let's help them!

Think of a simple experiment you have worked with at school and **complete** its report.

Experiment report

Title: _____

Introduction

- Hypothesis: _____
- Background information: _____

Method

- Materials: _____
- Procedure: _____

Results

- Data collected: _____

Discussion

- Analysis of data: _____

Conclusion

_____

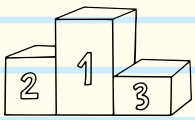
Get in groups and **share** your ideas.

Imagine you have a blog dedicated to sports and fitness. **Write** a blog post explaining how science (kinesiology, biomechanics and nutrition) can help athletes improve their performance.

Research how scientific principles are applied in sports to enhance performance and completion. **Use** the ideas from the template below to write your blog.

How science can improve athletic performance

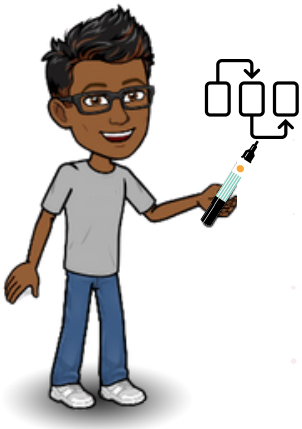
- Introduction
  - A brief overview of the connection between science and sports
- Body paragraphs
  - Kinesiology
  - Biomechanics
  - Nutrition
  - Training methods
- Conclusion
  - Summary of key points
  - Encouragement to apply scientific principles in athletic training



Nico and Freddie looked for information about how to understand scientific inquiry and experimentation.

Listen and **create** a flowchart that outlines the scientific method.

Include the following terms:



· conclusion · hypothesis · · control group · observation · · experiment · data collection · · variables · analysis · question ·

Get in pairs and **explain** the procedure of a scientific experiment.

- Choose an experiment you have conducted or are familiar with.
- Prepare a brief presentation explaining the procedure, from formulating the hypothesis to analyzing the data, and present it to the class.

You can **follow** this presentation outline to help you.

- **Introduction:** Introduce the experiment and its purpose.
- **Hypothesis:** State the hypothesis of the experiment.
- **Method:** Describe the materials and procedure used.
- **Results:** Explain the data collected during the experiment.
- **Discussion:** Analyze the data and draw to a conclusion.
- **Conclusion:** Summarize the key points of the experiment.

Imagine you are a scientist reporting on a past experiment. **Fill in the blanks** with the correct form of the words from the box. Two examples are provided to help you.

sign - arrive - improve - record - take - ask - ~~conduct~~ - discover - ~~prepare~~ - explain - complete - end - ask - analyze

Last week, the researchers 1 conducted an experiment to test the effects of a new sports nutrition supplement. While they 2 were preparing the materials, the participants 3 _____ and 4 _____ the consent forms. The researchers then 5 _____ the procedure to the participants. As they 6 _____ the instructions, some participants 7 _____ questions.

The participants 8 _____ the supplement and then 9 _____ a series of physical tests. The researchers carefully 10 _____ the data through the process. After the experiment 11 _____ , the researchers 12 _____ the results. They 13 _____ that the supplement 14 _____ the participants' endurance significantly.

3 Engineering marvels and environmental sustainability

What devices do you know that can be controlled automatically at home?
Have you ever used a smart device?
What was your experience like?

Match the words in the box to the definitions below. There is an extra option. Then, **combine** the words into an acronym, **add** the extra word below, and you will know what the lesson is about.

· modern · ~~sustainable~~ · home · automated
· responsive · technological ·

_____: Quick to react or adjust to changes or needs, whether it's technology or a person.

_____: Related to the use of tools, machines, or systems that make tasks easier and more efficient through science and engineering.

_____: When machines or technology do tasks by themselves, without needing people to control them all the time.

sustainable: Something that helps protect the planet by using resources wisely, without causing harm to the environment.

_____: Something that is new or current, often using the latest ideas, styles, or technology.

S sustainable

_____

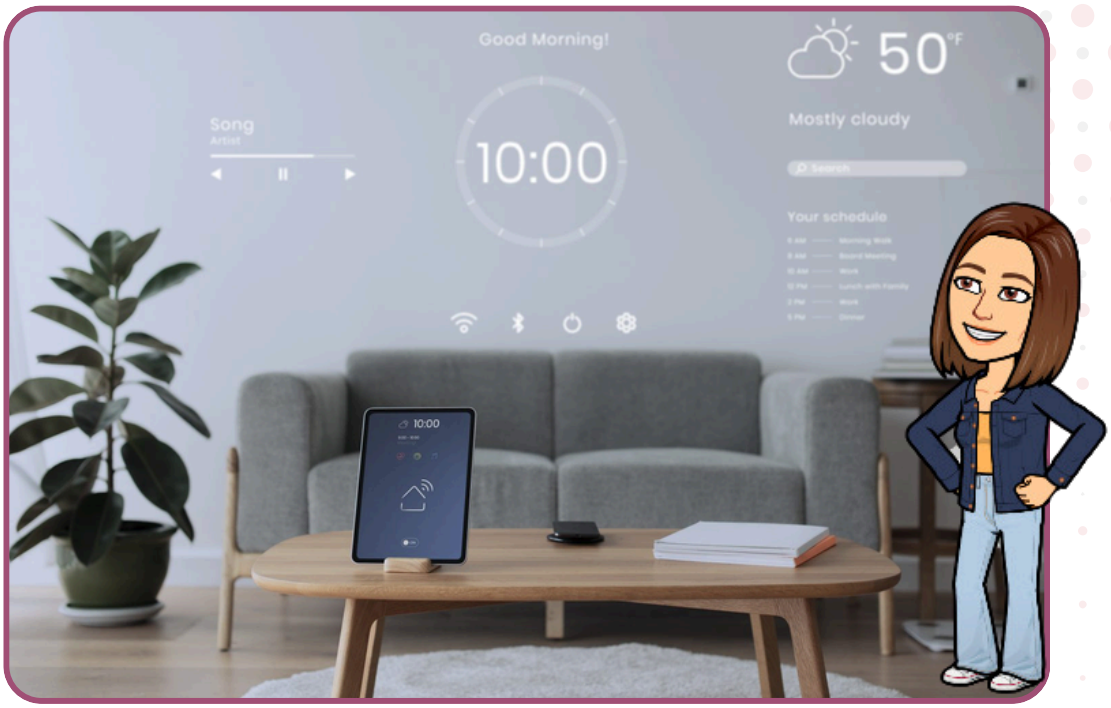
_____

_____

_____

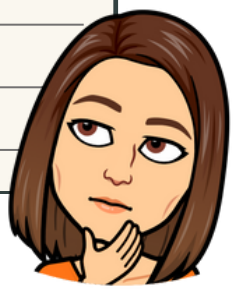
_____

Look at the photograph below. What does it represent?
Jot down all the automated processes/activities that you recognize in the picture.



Nayeli is very interested in this topic and she found a company that builds smart houses with a focus on green technologies.
Watch the advertisement and answer the question.

What is the purpose of SmartHome Solutions?



This is the magic of home automation!

Watch the video again and **put** the events in the correct order.

	The lights turn off automatically.
	The coffee machine prepares your favorite coffee.
1	The thermostat sets the temperature before you get up.
	The smart lock on the door recognizes you and unlocks automatically.
	The home security system activates.
	The lights turn on as you enter.
	The music starts playing.
	The thermostat adjusts the temperature.

Match the following sentence halves based on the context provided.

1	Engineers believe that smart homes	**a**	to reduce my energy bills.
2	I will install solar panels on my roof	**b**	sustainable living more in the future.
3	The company is going to launch	**c**	integrates all the latest green technologies.
4	We are going to see a significant increase	**d**	a new line of eco-friendly appliances next year.
5	They will introduce a new water conservation system	**e**	will have some form of smart technology.
6	I think people will appreciate the benefits of	**f**	will be more common in the next decade.
7	The architect is going to design a smart home that	**g**	at the upcoming tech expo.
8	By 2030, most new homes	**h**	in the use of automated systems in homes.

1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐

Get in pairs and **discuss.** Would you like to live in a smart house?

Read SmartHome Solutions' leaflet and **complete** the subheadings in the ***"Our services"*** section (there is an extra one).

· Convenient Living · Energy Efficiency · Green Technologies ·
· Climate Control · Advanced Security · Future-Proof Solutions ·

SmartHome Solutions

ECO-FRIENDLY SOLUTIONS FOR A SUSTAINABLE TOMORROW

ABOUT US

At **SmartHome Solutions**, we are passionate about creating state-of-the-art homes that integrate the latest in smart technology with environmentally friendly solutions. Our team of expert engineers and architects is dedicated to designing and building homes that are not only comfortable and convenient, but also sustainable and energy-efficient.

OUR MISSION

To lead the way in smart home technology and green building practices, ensuring every home we create is a step towards a healthier planet.

OUR VISION

To revolutionize the housing industry by making smart, sustainable living accessible to everyone and contributing to a greener world.

OUR SERVICES

1. _____ Reduce your energy bills with intelligent systems that optimize usage, set schedules and save energy with automated lighting systems.
2. _____ Monitor your home remotely with smart cameras and locks. Keep your family safe with real-time alerts and automated security protocols.
3. _____ Enjoy perfect temperatures all year round. Our smart thermostats learn your preferences and optimize energy usage.
4. _____ From automated coffee machines to smart fridges, experience the ultimate in modern living with automated solutions adapted to your lifestyle.

5. _____ Reduce your carbon footprint with our eco-friendly solutions, including solar panels, smart irrigation systems, and energy-efficient appliances.

CONTACT US

Join the smart home revolution with **SmartHome Solutions**. Contact us today to learn how we can transform your home into a smart, eco-friendly paradise!

- Phone: 123-456-7890
- Email: info@smarthomesolutions.com
- Website: www.smarthomesolutions.com

Read the following descriptions about smart home technologies and sustainability features. **Complete** the sentences by matching the two halves.

EN

1	Solar panels, _____, generate electricity from sunlight and reduce energy bills.	**a**	which collect and treat rainwater
2	Energy-efficient appliances, _____, use less water and electricity.	**b**	that learn your preferences
3	Rainwater harvesting systems, _____, recycle water for irrigation and other non-drinking purposes.	**c**	which incorporate green technologies and practices
4	Eco-friendly building materials, _____, have a lower environmental impact.	**d**	which are installed on the roof
5	Smart thermostats _____ optimize energy usage and maintain comfortable temperatures.	**e**	that are connected to the home automation system
6	Automated lighting systems, _____, help reduce energy consumption.	**f**	such as bamboo, adobe, and precast concrete
7	Security cameras and smart locks _____ enhance home safety and protection.	**g**	which can be scheduled and controlled remotely
8	Sustainable home designs _____ aim to minimize the carbon footprint.	**h**	that are integrated into smart home systems

1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐

Did you know?

"Future-proof solutions" are strategies or technologies designed to remain effective and relevant amid future changes or developments.

Get in pairs and **discuss.**

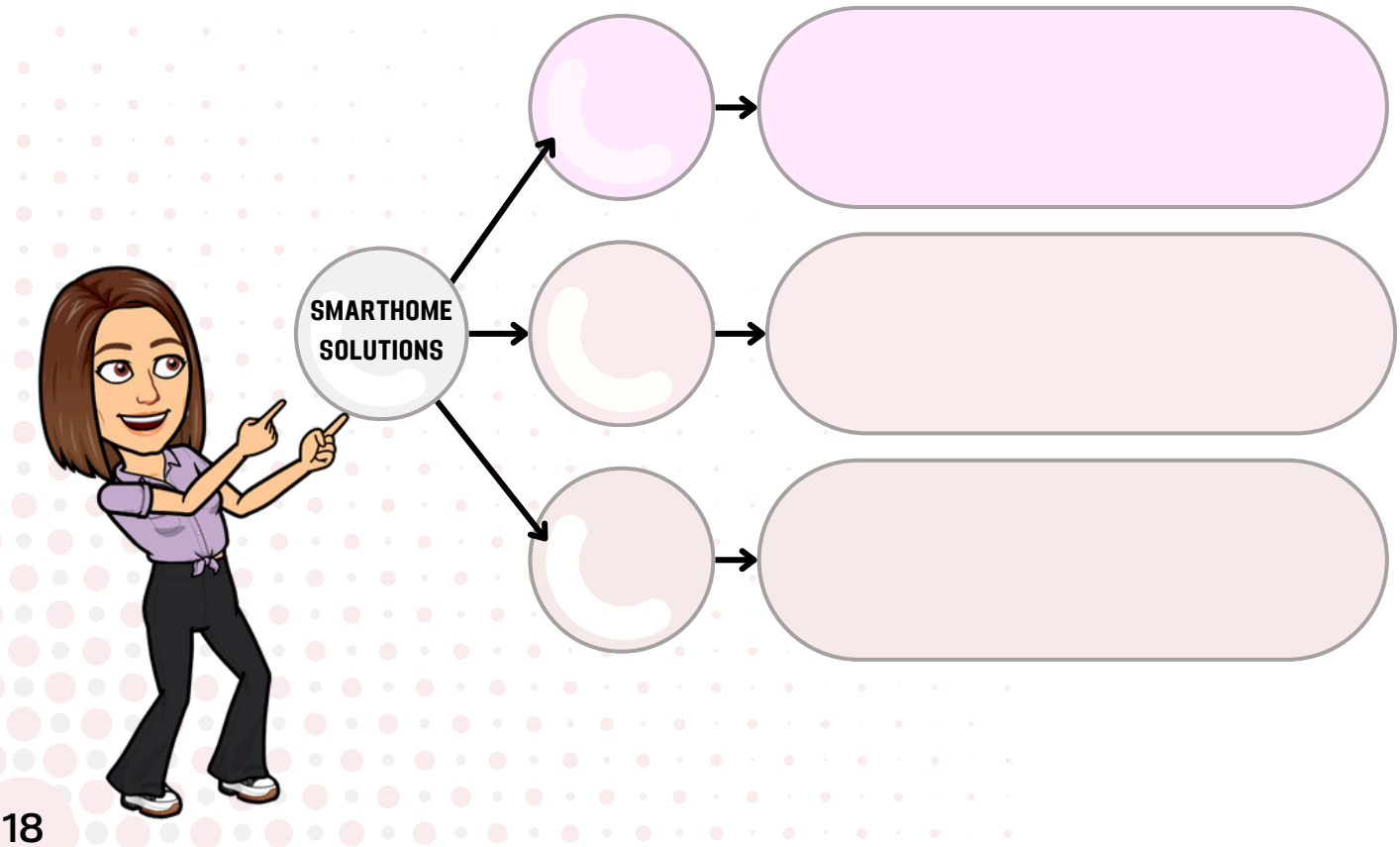
It is very common for companies to use mission and vision statements to define their purpose and communicate their goals to clients. **Read** *SmartHome Solutions* mission and vision statements and **explain** the difference between them.

Answer the questions.

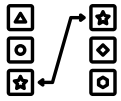
1. Which are the two services offered by SmartHome Solutions?
2. What is SmartHome Solutions committed to achieve?
3. How can smart lighting help save energy?
4. How does SmartHome Solutions use technology to enhance home security?
5. How do they integrate sustainability into their home designs?

Watch the second part of the video to learn more about how SmartHome Solutions integrate green technologies into their home designs.

Watch the video again and **complete** the mind map with the company's three sustainability pillars. **Include** at least three actions related to each of them.



Look at the icons below. **Match** them to the processes/objects they refer to.



1 blinds & curtains

2

3

4

5

6

7

8

9

10

https://www.flaticon.com/packs/smarthome-87?word=smart%20home

· speakers/voice assistant · security camera · humidity sensors · lightning · · entertainment · thermostat · ~~blinds & curtains~~ · locks · appliances · remote control ·

Time for reflection

Which activities from this lesson did you find more interesting? Why? Why not?

Which was/were the easiest task/s for you?

Which was the most challenging task? Support your answer.

Which are the benefits of using technology so far?

Project

- **Get in groups** and **choose** one of the topics from the chart.
- Then, **choose** one of the proposed ideas for the project.
- **Present** your project to the class.

Discussing sustainability

Why is it important for homes to incorporate both smart technology and eco-friendly solutions? How can this benefit individuals and the environment?

Designing your ideal smart home

Imagine you are designing your own smart home with a focus on sustainability. List three smart technologies and three eco-friendly solutions you would integrate into your home, and explain why you chose each one.

Exploring eco-friendly building materials and sustainable systems

Research various eco-friendly building materials and sustainable systems (e.g., rainwater harvesting) and their benefits. Choose three materials and two systems you would use in constructing a sustainable home and explain why you selected them.

Project ideas

Create a poster or infographic explaining the importance of combining smart technology with eco-friendly solutions in homes.

Create a short video or slide presentation discussing the benefits of smart, sustainable homes for individuals and the environment.

Write an essay or blog post analyzing the advantages of integrating smart technology with green building practices.

Project ideas

Build a model or draw a blueprint of your ideal smart home, highlighting the smart technologies and eco-friendly solutions you would use.

Create a digital presentation (e.g., PowerPoint or Google Slides) detailing your smart home design and explaining your choices.

Write a brochure or leaflet showcasing your smart home design, including descriptions and benefits of each technology and solution.

Project ideas

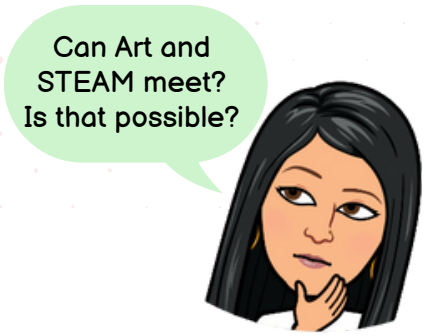
Create a sample materials board with physical or digital samples of the chosen materials and descriptions of the sustainable systems, including their benefits and impacts.

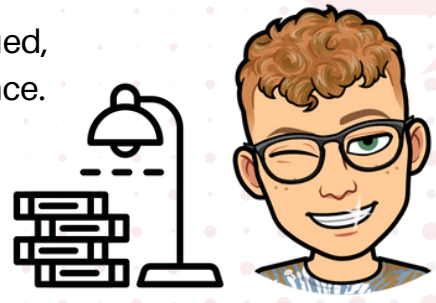
Create a presentation (e.g., PowerPoint or Google Slides) showing the eco-friendly materials and systems, explaining their advantages and potential impact on sustainability.

Write an article or blog post comparing traditional building materials and systems with eco-friendly alternatives, discussing the long-term benefits of using sustainable materials and systems.

4 Art in STEAM

Nico, Inés, Guidaí and Freddie are in the school corridor.
They see this ad on the wall.





Inés, Nico, Freddie and Guidaí feel intrigued, so they join the "STEAM ft. ART" experience.

There are four learning corners in the classroom.
Follow the teacher's instructions on the following pages.

Learning Corner 1 - STEAM-powered stories

a **Think** about a technological invention that fascinates you or a theme that combines art with elements of science or technology.

b **Write** a short story or poem that incorporates elements of science or technology or relates to a technological invention.

c **Use** descriptive language, adjectives and adverbs to enhance your writing.

You can use this structure to help you.

Title: _____

Theme: _____

Short story/poem: _____

Here is an example to help you.

The Algorithm's Melody

In a world of code and light,
Algorithms dance through the night.
Digital art and virtual dreams,
Science and art blend at the seams.

Learning corner 2: Thinking mathematically

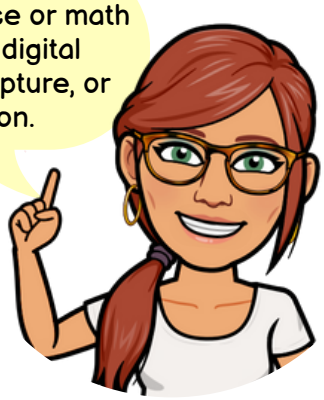
Math is more than just numbers and equations. It's about logic, problem-solving and finding patterns. Artists can use math to create beautiful and complex works!

a **Imagine** your school needs to rearrange the classroom furniture to fit more students comfortably (This is your problem!)

b Math to the Rescue! **Create** a mathematical model to solve this problem. This could involve using a scale drawing, calculating areas, or even creating a simple algorithm.

c Make yourself clear. **Write** a clear explanation of your mathematical model and how it would help solve the furniture placement problem.

Learning Corner 3: Place STEAM in the spotlight.



a. **Find** your inspiration. **Choose** a piece of art that demonstrates the connection between art and STEAM.

b. **Show** and **Tell. Present** the artwork to your friends and explain how it uses elements of STEAM. *What makes it interesting and unique?*

Learning Corner 4: Complete the reading mission: Math in action!

Sometimes, math can be the key to solving real-world problems.

Read a case study where mathematics was used to address a specific challenge.

Case study: Designing the perfect skateboard ramp challenge.

A group of teenagers wanted to build a skateboard ramp in their backyard, but they weren't sure what angle to make the incline for a smooth and safe ride.

- **Solution -** The teenagers decided to use geometry to design their ramp. Here's how:
  - **Researching safe ramps:** They found online resources that recommended safe incline angles for skate ramps, typically between 15 and 30 degrees.
  - **Understanding ratios:** They learned about the concept of ratios, which relates the rise (height) of the ramp to the run (length) of the ramp.
  - **Applying ratios:** Choosing a desired incline angle (let's say 20 degrees), they used the tangent function (tan(angle) = rise / run) on their calculator to find the ratio between the ramp's height and its length. For example, with a 20-degree angle, the tangent is approximately 0.36. This means for every unit of height they add to the ramp, they need to make the length of the ramp 0.36 units longer to maintain the safe incline.

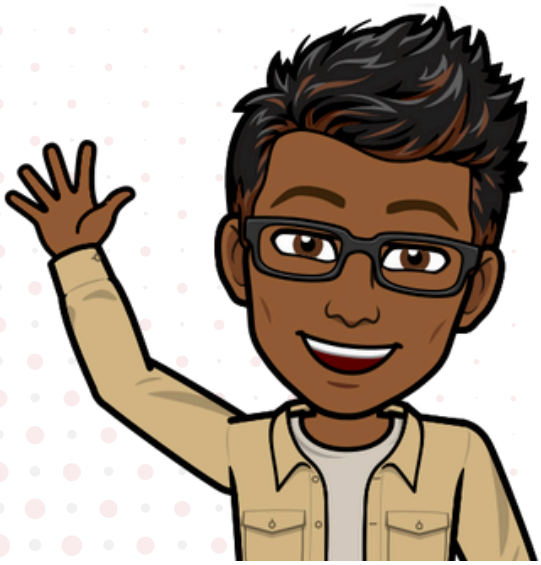
- **Implementation -** With a desired height for the ramp (e.g., 90 centimeters), they multiplied that height by the ratio (0.36) to find the length of the ramp needed (approximately 32.4 centimeters).
  - They used these measurements and basic geometry (drawing triangles) to create a blueprint for their ramp.
- **Outcome -** By applying math, they built a safe and enjoyable ramp with the perfect incline for their skill level. They gained practical experience with ratios and applied geometry to a real-world situation. The project fostered teamwork, problem-solving skills, and a sense of accomplishment.

After reading the case study, **answer** these questions:

1. What was the real-world problem that needed solving?
2. Why did the teenagers want to build a skateboard ramp, and what did they need to figure out to make it safe?
3. How did they approach the problem? What mathematical concepts did they use?
4. What steps did the teenagers take to design the ramp, and what math ideas helped them?
5. What was the solution and how did it benefit them?

EN Nico is comparing aspects of art and technology. **Read** the ideas and **choose** the correct option.

1. The digital painting was **more beautiful than / the most beautiful** the traditional one.
2. This sculpture is **more innovative than / the most innovative** piece of art I have ever seen.
3. The new art installation is **the largest / larger than** the previous one.
4. The light installation is **brighter than / the brightest** the digital painting.
5. Among all the artworks, the 3D-printed sculpture was **more impressive than / the most impressive**.
6. This virtual reality experience is **more immersive than / the most immersive** project in the exhibition.
7. The mathematical patterns in this artwork are **more complex than / the most complex** those in the other pieces.
8. The use of technology in this art piece is **more effective than / the most effective** in the others.



Project STEAM masterpiece!

Choose one of these options for a STEAM-inspired art project.

1. **Art Meets Science.** Create a piece of art that reflects a scientific concept you find fascinating (e.g., the solar system, the human body)
2. **Math Magic:** Use mathematical shapes, patterns, or algorithms to create a visually stunning artwork.
3. **Tech Time!** Explore digital art tools and software to create a piece of digital art, animation, or virtual reality experience.

Be ready to present your choice to the rest of the class. There are no limits to creativity!

Presentation outline

Introduction

- Introduce the artwork and artist.
- Briefly explain its STEAM connection.

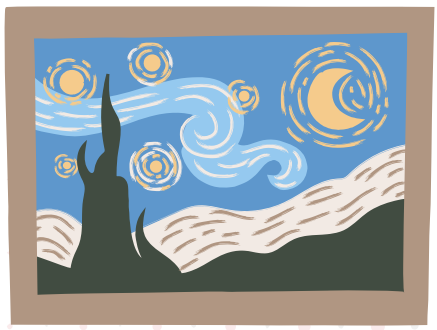
Description

- Describe the artwork using adjectives and adverbs.
- Compare it to other similar works using comparative and superlative forms.

Significance

- Explain how the artwork integrates STEAM elements.

Example



Artwork: *"The Starry Night"* by Vincent van Gogh.

STEAM Connection: The use of mathematical patterns in the depiction of the night sky.

Significance: Van Gogh's work demonstrates an understanding of fluid dynamics and turbulence, which are studied in physics.

5 The Scully Effect

Get in pairs. Look at the photos below and **discuss** these questions.

- Who are they?
- What are they known for?
- What do they have in common?
- Are they real or fictional characters?

Images from commons.wikimedia.org - goodfon.com/films - flckr.com

Use your ideas to **complete** the chart below.
You can make an image search if you don't recognize the people from the photos.

	Real / Fictional name	TV show / movie	Occupation
1			
2			
3			
4			

Let's talk about women in STEAM fields. **Get in pairs** and **discuss** these questions.

1. Do you think there are enough female role models represented in science, technology, engineering, art and math (STEAM) fields?
2. How can we encourage more girls to pursue careers in these fields?

Watch the video clip and **choose** which option best describes its topic.

a. The video explores the history of women in STEAM and their representation in media.
b. The video talks about the advancements in forensic science and how television shows like CSI have popularized the field.
c. The video discusses the impact of a fictional character on women's interest in STEAM fields.

Watch the video again and **match** these lines to the person who said them.

1	*"What I find fantastic is any notion that there are answers beyond the realm of science. The answers are there, you just have to know where to look."*	A	Madeline di Nonno
2	*"What we have found is that because of the character of Scully, women and girls have been pursuing forensic science degrees for college careers."*	B	Physics Major
3	*"...a lot of young women said: "that's me", "I'm interested in that."*	C	Dana Scully
4	*"I know that the character of Dana Scully was a physics major, and she inspired me to major in physics and go through and get my PhD. Thank you a lot."*	D	Gillian Anderson

1 ☐ 2 ☐ 3 ☐ 4 ☐

Get in pairs and **discuss** what the Scully Effect is. **Write** a short explanation of this effect based on the information from the video and the matching activity.

Inés found an interesting article about the Scully Effect.

Read it and **check** your ideas.

THE X FILES

The Scully Effect

In the world of entertainment media, where all scientists are often portrayed as men wearing white coats and working alone in labs, Agent Dana Scully from the popular television program *The X-Files* stood out in the 1990s as the only female STEAM character in a prominent, primetime television role.

A study conducted in 2019 by the *Geena Davis Institute of Gender in Media* showed that 55% of the women surveyed decided to enroll in science, technology, engineering, and mathematics (STEAM) fields thanks to the character played by Gillian Anderson in *The X-Files*. The show's impact has been so big that the rise in women in science is often called '*The Scully Effect*'.

The study surveyed exactly 2.021 participants selected to form a representative sample of the female population old enough to have watched *The X-Files* during its original broadcast in the 1990s. When analyzing the results, the participants were divided into two main groups: casual viewers of the show (who had seen between 0 and 8 episodes) and regular viewers (who had seen more than 8 episodes).

Some of the study's conclusions were as follows:

- 63% of women working in a STEAM field said Dana Scully served as a role model and inspiration.
- Regular viewers were 43% more likely than casual viewers to consider working in a STEAM field.
- 91% of the women surveyed considered Dana Scully a role model for girls and adult women.

Television shows can inspire us more than many other formats. While you may see a female scientist occasionally on the news or in the newspaper, *The X-Files* showed us one on TV every week for 45 minutes. For more than 10 years, Dana Scully used her scientific knowledge and worked weekly in labs and morgues before shows like CSI.

In the show, Dana Scully is an FBI Special Agent and a medical doctor with a strong background in science, known for her rational, evidence-based approach to solving paranormal cases. Scully's character became iconic as a smart, determined, and professional woman in a male-dominated field.

On the subject, Gillian Anderson said: *"To suddenly have an appealing, intelligent, strong-minded female who was appreciated by her pretty cool male co-worker, was an awesome thing, and I think that a lot of young women said, 'That's me. I'm interested in that. I want to do that. I want to be that.'"*

One explanation for this effect comes from the *Geena Davis Institute*'s slogan, "IF THEY CAN SEE IT, THEY CAN BE IT." For many girls and women, the scarcity of females in STEAM fields, both in real life and in media, makes it hard for them to imagine themselves in those roles. The Scully Effect highlights the importance of media representation in inspiring career aspirations and breaking gender stereotypes.

(Images from Wikimedia Commons and Leonardo.ai)

Read the article again and **answer** these questions.

1. Who are Dana Scully and Gillian Anderson?
2. According to the study, what impact did Dana Scully have on women's interest in STEAM fields?
3. Describe the difference in influence between casual and regular viewers of The X-Files.
4. How did Gillian Anderson describe the reaction of young women to her character?
5. Why is the slogan "IF THEY CAN SEE IT, THEY CAN BE IT" significant in the context of the Scully Effect?

Find these figures in the text. What do they refer to?

8 _____

10 _____

41% _____

45 _____

_____ 63%

_____ 91%

_____ 2019

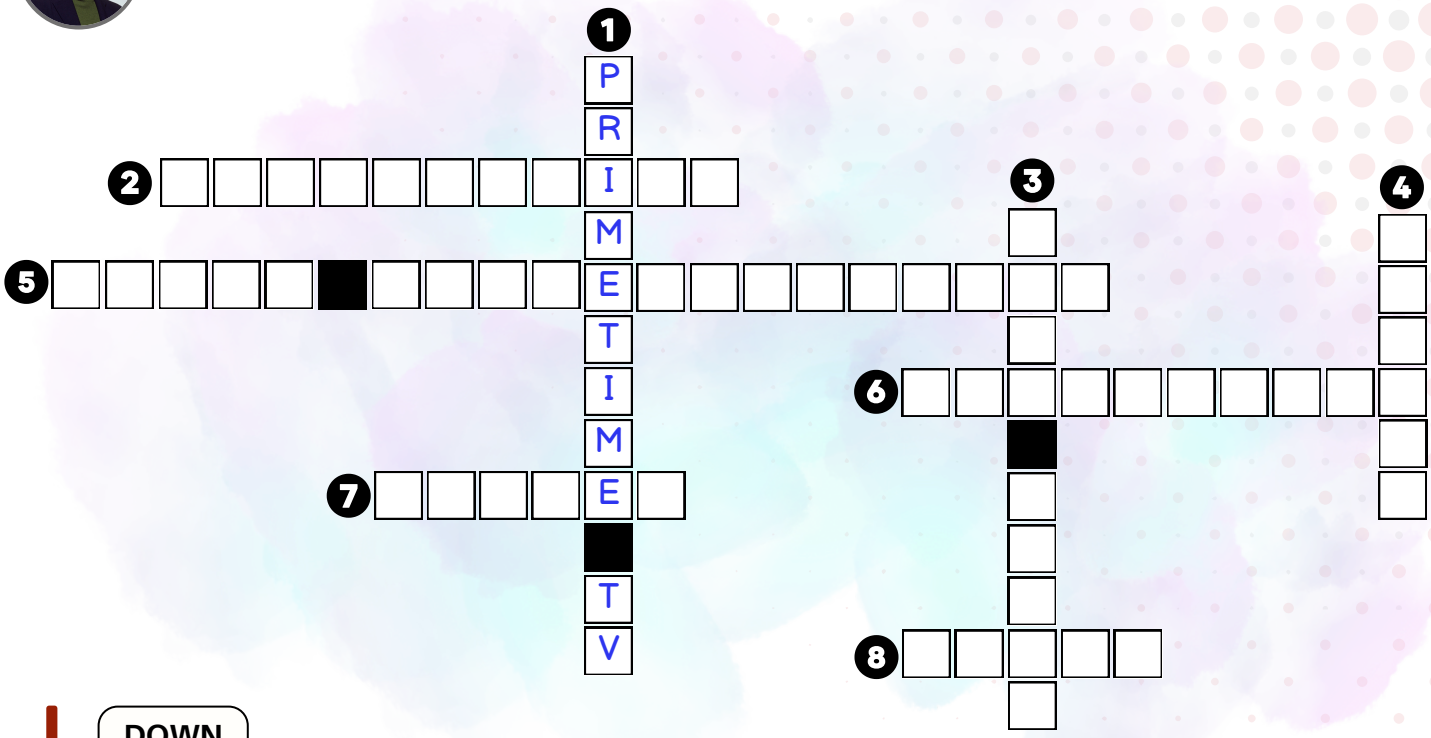
_____ 2021

(Images from Goodfon.ru)

Dana Scully was both an FBI agent and a medical doctor, two professions that heavily rely on science. Can you list the specific science fields that support each of these roles?

Law enforcement	medicine
psychology	pharmacology

Complete the following crossword with keywords from the article.



DOWN

1. The time period when the largest number of people are watching television, typically in the evening.
3. A person looked to by others as an example to be imitated.
4. A long-term job or profession.

ACROSS

2. The process of being mentally stimulated to do or feel something creative or beneficial.
5. How different groups are portrayed in television, film and other media.
6. A widely held but fixed and oversimplified image or idea of a particular type of person or thing.
7. It refers to the social and cultural roles, behaviors, and attributes that a society considers appropriate for men and women.
8. The acronym for Science, Technology, Engineering, Arts and Mathematics.

Get in pairs and **discuss.**

- **Why do you think the words in the crosswords are considered 'keywords'?**
- **Would you add any other word to this list?**
- **Why?**

Did you know?

A keyword /ˈkiːˌwɜːrd/ is a word or concept of great significance on a topic, document or text.

EN In the article about the Scully Effect, the author describes the historical impact of the Dana Scully character and the recent research study. **Read** the following excerpts from the article and rewrite each sentence **b** to convey the same information.

1

a *A study conducted in 2019 by the Geena Davis Institute of Gender in Media showed that 55% of the women surveyed decided to enroll in science, technology, engineering, and mathematics (STEAM) fields because the character played by Gillian Anderson in The X-Files inspired them.*

b In 2019, a study _____ by the Geena Davis Institute of Gender in Media. It showed that 55% of the women who enrolled in STEAM fields _____ by the character played by Gillian Anderson.

2

a *When analyzing the results, the research team divided the participants into two main groups: casual viewers of the show (who had seen between 0 and 8 episodes) and regular viewers (who had seen more than 8 episodes).*

b When the results _____, the participants _____ into two main groups: casual viewers of the show (who had seen between 0 and 8 episodes) and regular viewers (who had seen more than 8 episodes).

3

a *The Scully Effect highlights the importance of media representation in inspiring career aspirations and breaking gender stereotypes.*

b The importance of media representation in inspiring career aspirations and breaking gender stereotypes _____ by the Scully Effect.

4

a *Television shows can inspire us more than many other formats. While you may see a female scientist occasionally on the news or in the newspaper, The X-Files showed us one on TV every week for 45 minutes.*

b Television shows can inspire us more than many other formats. While a female scientist _____ occasionally on the news or in the newspaper, The X-Files showed us one on TV every week for 45 minutes.

Debate The role of media in influencing career choices

1. **Form two groups**: one supporting the positive role of media in influencing career choices, and one opposing it.
2. **Prepare** your arguments. You can use the SOS Box below.
3. **Engage** in a structured debate, taking turns to present and respond to arguments.

Debate preparation sheet

Supporting media's role

- Media provides role models (e.g., Dana Scully).
- Positive representation can inspire confidence.
- If more diverse characters are shown, more people could be inspired to pursue different careers.

Opposing media's role

- Media often reinforces stereotypes.
- Representation in media is not always realistic.
- People should not rely solely on media for career inspiration.

- Media **can** provide role models.
- Positive representation **should** inspire confidence.
- Media **must** strive for realistic portrayal to be effective.
- **If** more diverse characters were shown on TV, more people could be inspired to pursue different careers.
- **Unless** there's more representation in the media, young people will not have the confidence to pursue STEAM careers

Debate structure

Opening statements
Each group presents their main arguments (2 minutes per group)

Rebuttal
Each group responds to the opposing group's arguments (2 minutes per group)

Discussion
Open the floor for additional points and counterarguments (5 minutes total)

Closing statements
Each group summarizes their main points and makes a final appeal (1 minute per group)

Tips for effective debate

- Use clear and concise language.
- Back up your arguments with examples and evidence.
- Listen carefully to the opposing side and respond thoughtfully.
- Stay respectful and professional throughout the debate.

Project STEAM female role model exploration

1. **Get in groups** of 3-4 students.

2. **Choose** a STEAM role model.
   - Select a real-life or fictional female role model from the STEAM fields who inspires you.

3. **Research** and **gather** Information about your chosen STEAM role model. Include:
   - Name and background (e.g., education, career achievements)
   - Contribution to the field of STEAM.
   - Qualities or characteristics that make the chosen person a role model (e.g., perseverance, innovation, leadership)
   - Impact.

4. **Descriptive writing. Write** a descriptive paragraph or short essay (about 150-200 words) that captures the essence of your STEAM role model.
   - Introduction: Briefly introduce your female role model and why you chose her.
   - Body Paragraphs: Provide detailed descriptions of her background (real of fictional), achievements, challenges, and impact.
   - Conclusion: Reflect on why this role model inspires you and how she has influenced your, or others', interest in STEAM.

5. **Presentation phase. Prepare** a visual presentation (e.g., PowerPoint) to present your STEAM role model to the class.
   - Include key points from your essay/profile: background, achievements, challenges and impact.
   - Use visuals such as photos, diagrams, or quotes to enhance your presentation.
   - Prepare to present your findings to the class, highlighting why your chosen role model is significant in the field of STEAM.

6 Environmental challenges and technological solutions

Inés, Freddie, Simon and Nico are in science class.

Environmental challenges require us to explore technological solutions.

Listen to the science teacher explaining climate change and **answer.**

1. What are the main causes of climate change mentioned?
2. Can you describe two technological solutions proposed to combat climate change?
3. How does the use of renewable energy help in reducing pollution?
4. What role do sensors and automation play in environmental conservation?

Get in pairs and **compare** your answers with your partner.

What technological solutions can be implemented to tackle environmental challenges?

Read the text and **identify** key technologies and how they address specific environmental problems.

TACKLING ENVIRONMENTAL CHALLENGES WITH TECHNOLOGY

As the world faces environmental challenges, technology has emerged as a crucial ally in the fight against pollution, climate change, and ecosystem degradation. Renewable energy sources such as solar and wind power are reducing our reliance on fossil fuels, thereby cutting down on greenhouse gas emissions. Automation and sensors are being deployed to monitor environmental conditions in real time, providing valuable data for conservation efforts.

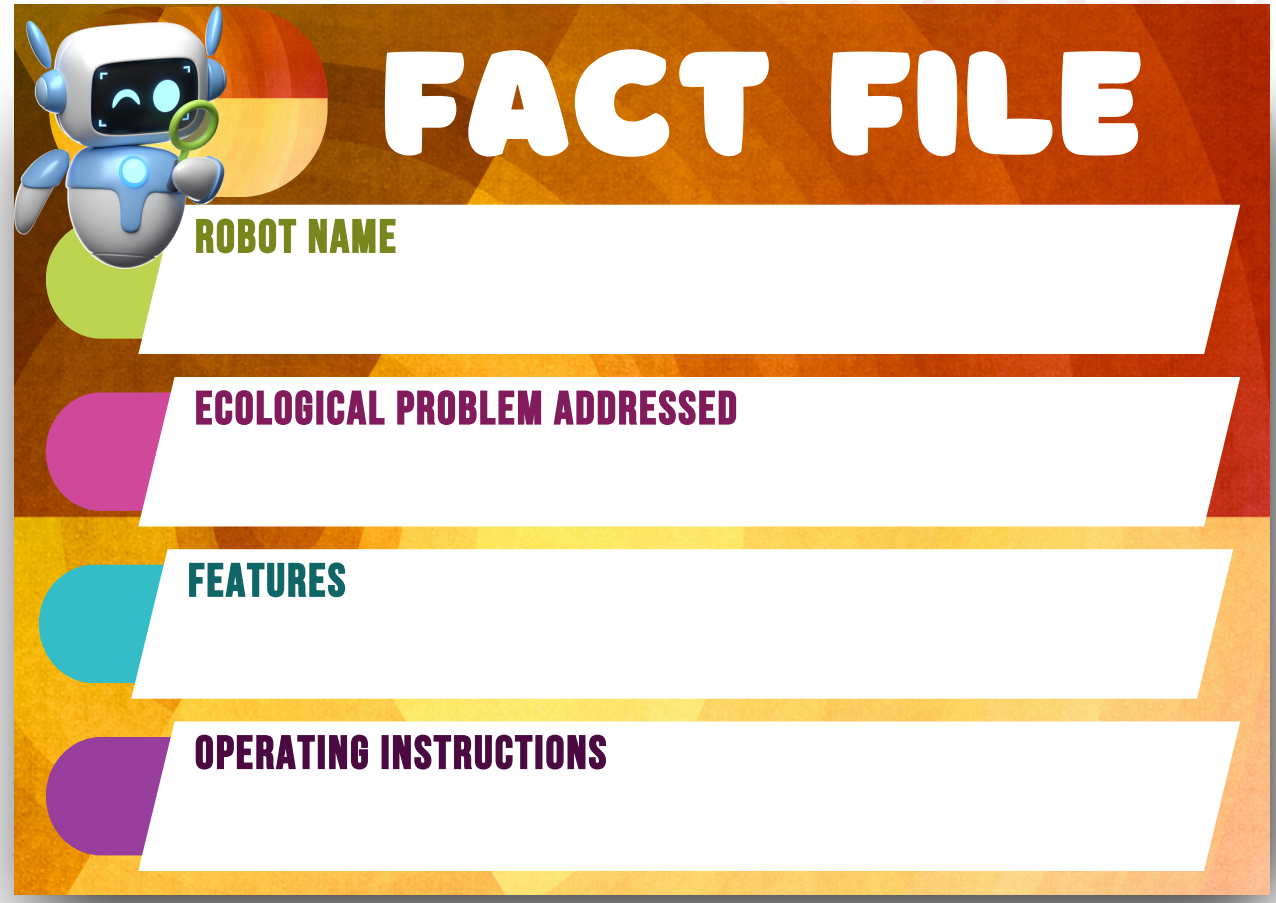
Innovations in programming have led to the development of robots that can clean up oil spills, manage waste, and even plant trees in deforested areas. These technological advancements are not only helping to mitigate damage but are also paving the way for a more sustainable future.

Read the text and **answer**.

1. How do renewable energy sources help in reducing greenhouse gas emissions?
2. In what ways are sensors being used to aid conservation efforts?
3. Describe a technological innovation mentioned in the article that addresses pollution.
4. What are the benefits of using robots in managing environmental issues?

Get in pairs and **discuss** the benefits of sensors in conservation efforts and robots in managing environmental issues.

Inés and Nico want to create a robot designed to solve an ecological problem.
Complete the fact file to help them write an instruction manual for the robot.



Share your ideas with the rest of the class.

EN **Rewrite** the following sentences using the beginnings provided.

a *The teacher explains climate change to the students.*
Climate change _____.

b *Renewable energy sources reduce greenhouse gas emissions.*
Greenhouse gas emissions _____.

c *Automation and sensors monitor environmental conditions in real time.*
Environmental conditions _____.

d *Robots clean up oil spills and manage waste.*
Oil spills and waste _____.

Debate Pros and cons of robotics in addressing environmental issues

1. **Form two groups:** one supporting the use of robotics in addressing environmental issues, and one opposing it.
2. **Prepare your arguments** using cause and effect relationships and relative clauses.
3. **Engage in a structured debate**, taking turns to present and respond to arguments.

Debate preparation sheet

Supporting Robotics

- Robotics can efficiently monitor pollution levels, which helps in the early detection of environmental hazards.
- Robots can be used in areas dangerous to humans, such as toxic waste sites, reducing the risk of human harm.
- Automation in agriculture can lead to more sustainable farming practices, which reduce deforestation and conserve resources.

Opposing Robotics

- The high cost of development and maintenance of robots may not be feasible for all regions.
- Over-reliance on robotics could lead to job losses in certain sectors, causing economic issues.
- Potential for technical failures and the need for constant updates and monitoring.

EN In the debate activity on the use of robotics in addressing environmental issues, you were encouraged to use cause-and-effect relationships to support your arguments. **Read** the following statements and **identify** the cause and effect. You can choose one color to identify the cause and another color to identify the effect in each statement.

- Robotics can efficiently monitor pollution levels, which helps in early detection of environmental hazards.
- Automation in agriculture can lead to more sustainable farming practices, which reduce deforestation and conserve resources.
- Over-reliance on robotics could lead to job losses in certain sectors, causing economic issues.

TIP !

Use the cause and effect relationships in your own arguments for the debate. Use words and phrases like "because," "as a result," "consequently," "therefore," etc. to clearly indicate the cause-and-effect relationship.

Project Sustainability project for your school

1. In small groups, **develop** a sustainability project for your school or the community.
2. **Identify** an environmental challenge in your school or community.
3. **Plan** a sustainability project that addresses this challenge using technology.
4. **Create** a project proposal including objectives, methods, required materials and expected outcomes.
5. **Present** your project to the class.

You can go over the **project planning guide** to help you.

Environmental challenge

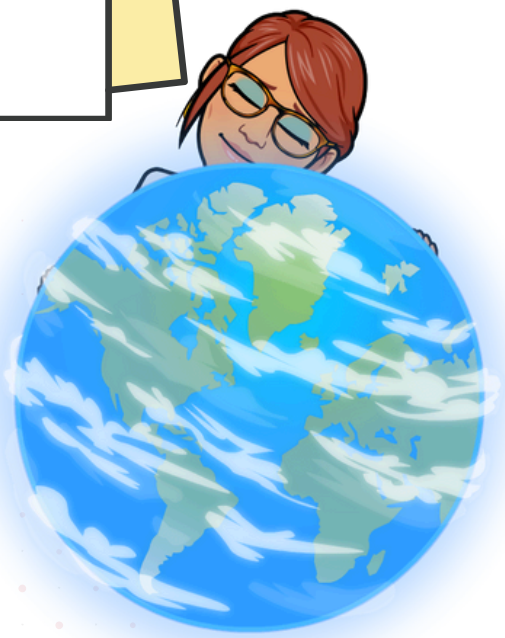
Project title:

Objectives:

Methods:

Required materials:

Expected outcomes:



7 Engineering and art: aesthetic and functional design

Nico and his family visited this place.
Where did they go?

Photos by Aldo Rodríguez

Describe the pictures and **guess** what city it is. Here you have some clues:

1. It is the capital city of a country of the same name.
2. Its currency is called the Balboa.
3. Using aboriginal knowledge, one of the most advanced engineering marvels was built there.
4. It allows big cargo ships to move from the Atlantic Ocean to the Pacific Ocean easily.
5. It is a very advanced city in terms of connectivity.

One of the places Nico visited was the Panama Canal, and he was amazed by this incredible achievement of engineering. He decided to write a report about the canal, explaining what it is. Here's what Nico wrote about it.

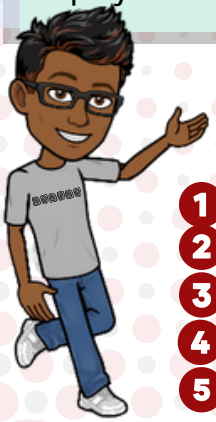
The PANAMA CANAL

The Panama Canal is an engineering marvel that spans 80 kilometers across the Isthmus of Panama connecting the Atlantic Ocean to the Pacific Ocean. It provides a crucial shortcut for international maritime trade. The knowledge aboriginal people had about the land and how to connect one ocean to the other was very important to the construction of the Canal. The Panama Canal is vital for global maritime trade, significantly reducing travel time and costs for ships traveling between the two oceans.

HOW WAS IT CONSTRUCTED? Construction began in 1904 by the United States, after earlier unsuccessful attempts by the French in the late 19th century. It took 10 years to be built and it was completed and opened in 1914, allowing ships to transit between the oceans. The canal has a system of locks that raise and lower ships as they pass through. There are three sets of locks: Gatun locks on the Atlantic side, Miraflores and Pedro Miguel locks on the Pacific side.

WHAT IS THE IMPACT OF THE PANAMA CANAL? It has had profound economic, social and environmental effects. Economically speaking, it facilitates the movement of goods and materials around the world and impacts global commerce. In 2016, the canal underwent a major expansion project involving the construction of new locks. This expansion doubled the canal's capacity and allowed for more significant volumes of trade. Environmentally speaking, the canal's construction and operation have had environmental impacts, particularly on local ecosystems and water quality. Socially speaking, the canal's presence has also shaped the development of Panama and influenced its economy and society.

CONCLUSION The Panama Canal is a symbol of human achievement and has played a pivotal role in shaping global trade and connectivity since its creation over a century ago. It has become part of Panama's identity and it is one of the most important sources of income in the country. It also employs hundreds of workers in its facilities.

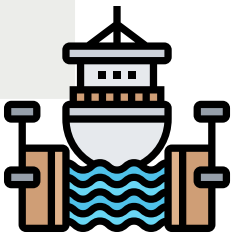


Nico's classmates said some things about the Panama Canal. The statements are wrong. **Read** the text and **correct** them.

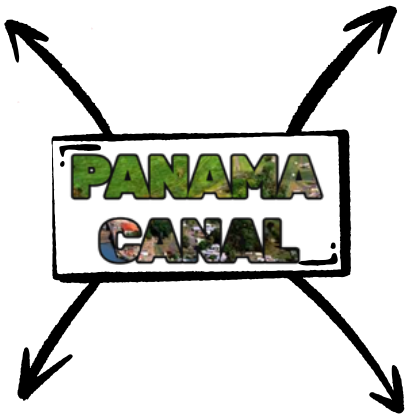
1. The Panama Canal has a length of over one hundred meters.
2. The construction of the Panama Canal impacted the local maritime economy.
3. It took a decade for the French to construct the Canal.
4. There are currently three locks along the Canal.
5. Tourism outnumbers the Canal in terms of the income the country receives.

Nico wrote a report on his visit to the Panama Canal. **Look** at the different parts and **find** evidence of each one.

Introduction	
Section/s	
Conclusion	

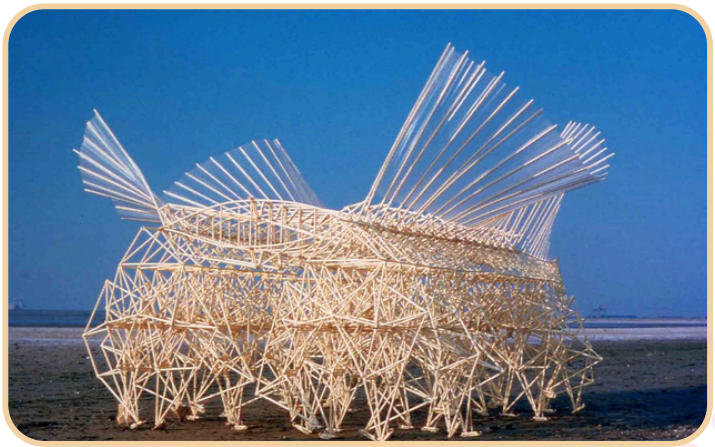


Read the text again and **create** a mind map to summarize the most important ideas.



Nico shared a picture of a sculpture that combines art and engineering.
Have you ever seen a piece of art that reflects engineering principles or uses technology in a creative way? This could be a sculpture made from recycled materials, a digital artwork that uses complex algorithms, or even a building that is a work of art itself!

Discuss with a partner.

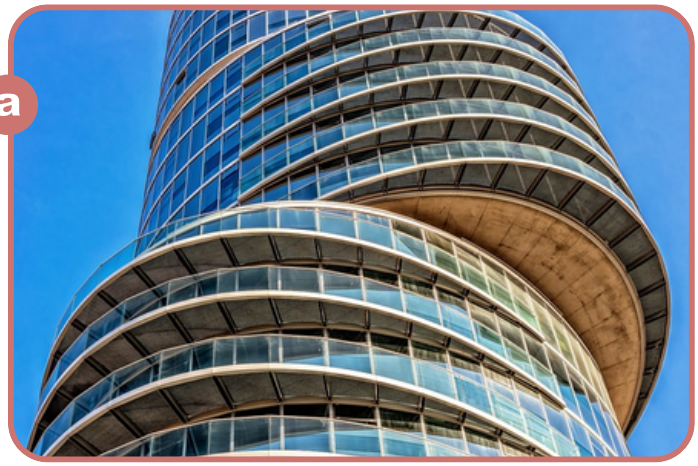


https://www.therpf.com/

These pictures combine engineering and art. **Get in trios**, **describe** the places and **answer** the following questions.

- What are some of the engineering challenges that were overcome in building these structures?
- How does the design of places incorporate artistic principles? Think about its shape nd how it interacts with the surrounding environment.
- Do you find these structures aesthetically pleasing? Why or why not?

a



b

c

d

e

Photos. pixabay.com

Let's get creative!

Write a short story using one of these buildings as its scenario. Don't forget to include elements of engineering and art. Feel free to invent the number of characters you want and create an avatar for them. A strip story could to be created with technology aid.

You can jot down some notes here....

EN

Nico's teacher challenged him and his friends with a text. It talks about the combination of art and engineering. Some of the words were removed from the text. **Put** them in the correct place.

a) intersect
b) example
c) collaborate
d) distinct
e) roof
f) structural
g) digital

Engineering and art may seem like two **1)**_____ fields, but they often **2)**_____ in fascinating ways. Take the Sydney Opera House, for **3)** _____ . This architectural marvel combines **4)** _____ engineering with artistic design. Its unique sail-like **5)** _____ structures were created using advanced engineering techniques, while its aesthetic appeal has made it an iconic symbol of Australia. Similarly, modern **6)** _____ art installations frequently use programming and virtual reality to create interactive experiences. These examples show that when engineers and artists **7)** _____ , they can create works that are both functional and beautiful.

1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐

Project Dream big and build beautifully!

Unleash your inner engineer and artist! Create a model or blueprint of your own engineering project. Here are some ideas to get you started:

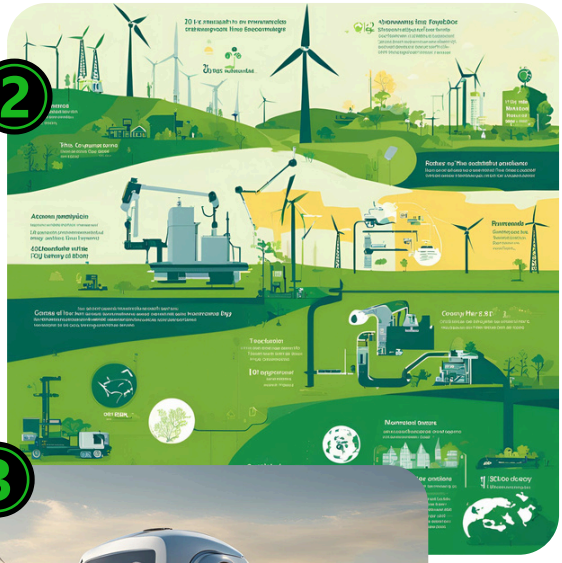
- **Sustainable cityscape:** Design a model city that incorporates sustainable engineering principles and beautiful architecture.
- **Functional art:** Create a piece of art that also serves a functional purpose, like a lamp that uses recycled materials or a bridge made out of building blocks.
- **Future innovation:** Imagine a future invention that combines cutting-edge technology with stunning design. Draw a blueprint or create a 3D model of your creation.

Remember, there are no limits to your creativity! Explore the exciting world where engineering meets art and design a masterpiece!

Complete the sentences with a correct form of the words in brackets.

1. The Sydney Opera House is an ___architectural___ marvel that combines engineering with artistic design. **(ARCHITECT)**
2. Its unique sail-like structures were created using _____ engineering techniques. **(ADVANCE)**
3. The building is an _____ symbol of Australia, and it's one of the most famous architectural landmarks in the world. **(ICON)**
4. Modern digital art installations frequently use programming and virtual reality to create _____ experiences. **(INTERACT)**
5. When engineers and artists collaborate, they can create works that are both _____ and beautiful. **(FUNCTION)**
6. The Eiffel Tower is a great example of engineering and art; it's one of the most famous _____ in the world. **(LAND)**
7. The Guggenheim Museum in Bilbao, Spain, is an architectural _____ that combines engineering and art. **(MASTER)**
8. The Burj Khalifa in Dubai is the tallest building in the world; it's a great example of _____ engineering and art. **(MODERNIZE)**
9. The Millau Viaduct in France is the world's tallest cable-stayed road bridge; it's a great example of engineering and _____ . **(ARTISTIC)**
10. The Golden Gate Bridge in San Francisco is an iconic symbol of the United States; it's a great example of _____ and art. **(ENGINEER)**

8 The Green Debate: powering our future



Images generated with AI

What do these images suggest?
Take notes.

In pairs or small groups, **discuss** what these images suggest about the role of robotics in energy production and the environmental impacts of renewable energy.

Read about the impact of renewable energy on our ecosystem and **identify** key points about its benefits and potential drawbacks.

The impact of renewable energy on ecosystems

Renewable energy sources, such as solar, wind, and hydroelectric power, offer significant environmental benefits over fossil fuels.

They reduce greenhouse gas emissions, decrease pollution, and conserve natural resources. Solar farms and wind turbines have minimal impact on land and water resources compared to traditional power plants. However, there are challenges to consider.

The construction and maintenance of renewable energy infrastructure can disrupt local wildlife habitats. For instance, wind turbines have been known to affect bird and bat populations. It is crucial to carefully plan and manage renewable energy projects to minimize their ecological footprint while maximizing their environmental benefits.

Read the text again and **answer.**

1. What are the main environmental benefits of renewable energy?
2. How do solar farms and wind turbines compare to traditional power plants in terms of land and water impact?
3. What challenges are associated with renewable energy infrastructure?
4. Why is careful planning and management important for renewable energy projects?

Listen to an expert talking about the role of renewable energy in powering our future and **answer** these questions.

a. Why is renewable energy important for the future?
b. What are some examples of renewable energy sources mentioned in the audio?
c. How have advances in technology impacted renewable energy?
d. What are the benefits of investing in renewable energy infrastructure?

Debate

What are the pros and cons of using robots in renewable energy production?

Let's share our ideas on the topic through a debate!

1. **Form two groups:** one supporting the use of robots in renewable energy production and one opposing it.
2. **Prepare** the arguments to discuss the impact and potential future benefits.
3. **Engage in a structured debate**, take turns to present and respond to arguments.

Debate preparation sheet sample

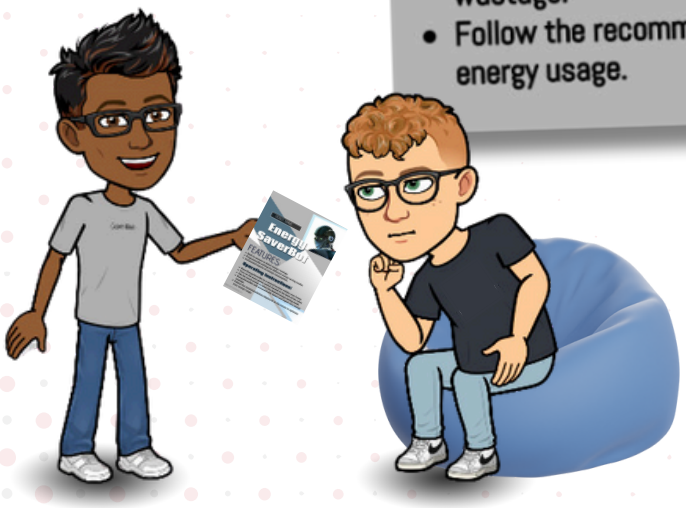
Supporting Robots

- Robots have been used in the production of solar panels, improving efficiency and reducing costs.
- Automation in wind turbine maintenance has decreased the need for human labor in dangerous conditions.
- Sensors and robots can monitor and optimize energy production, leading to more sustainable practices.

Opposing Robots

- High initial costs and maintenance expenses may outweigh the benefits.
- Potential job losses in the renewable energy sector as automation increases.
- Dependence on technology could lead to vulnerabilities if systems fail.

Nico and Freddie prepared an instruction manual for a robot designed to improve energy efficiency.

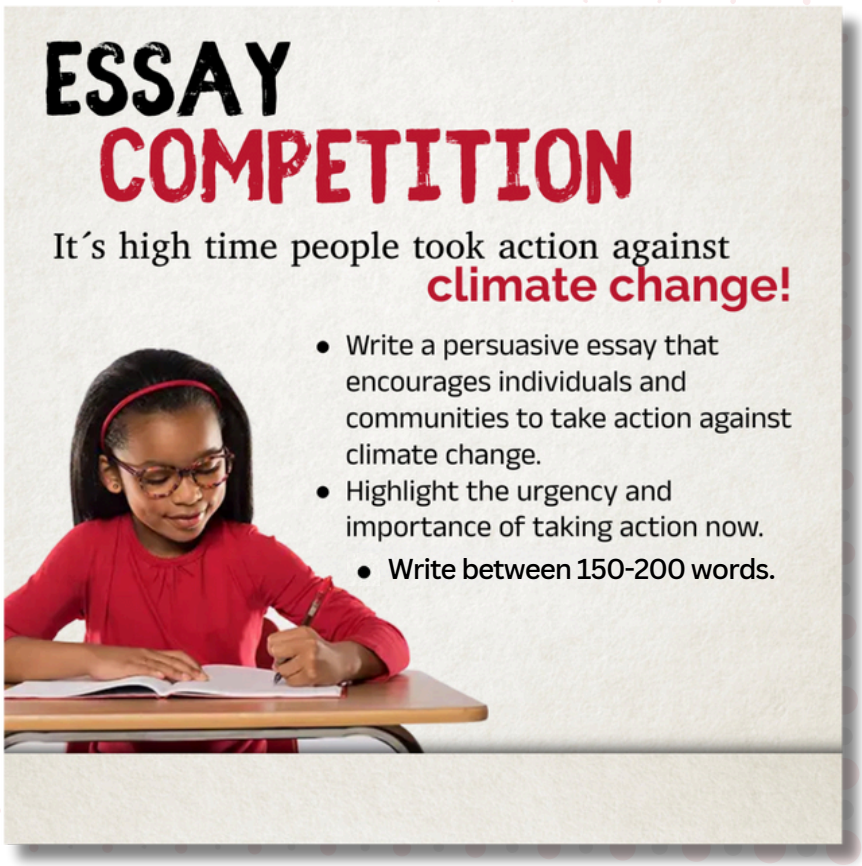


Get in pairs. Design a robot that helps improve energy efficiency in homes or industries. **Write** an instruction manual for the robot. **Remember** to give clear instructions.

EN Guidaí and Inés are sharing their thoughts about the Green Debate. **Choose** the correct option.

1. If we **a) invest - b) had invested - c) invested** more in renewable energy, we **a) will reduce - b) would have reduced - c) would reduce** our carbon footprint significantly.
2. If solar panels **a) became - b) became - c) had become cheaper**, more people **a) will install - b) would install - c) would have installed** them on their homes.
3. If the government **a) does not support - b) did not support - c) had not supported** renewable energy projects, it **a) wil be - b) would e - c) would have been** harder to combat climate change.
4. If we **a) have - b) had - c) had had better** technology in the past, we **a) will avoid - b) would avoid - c) would have avoided** some of the current environmental issues.

Inés is worried about the environment and how people don't take action against climate change and wants to participate in the essay competition.



Writing tip!

Introduction

- Introduce the issue of climate change and its current impact.
- State your thesis: We must take immediate action to combat climate change.

Body

- Discuss the causes and effects of climate change.
- Provide examples of successful actions taken to reduce carbon footprints.
- Use cause-and-effect relationships to show the benefits of taking action.

Conclusion

- Summarize the key points.
- Reinforce the urgency of taking action now.

Read Inés essay and **identify** with colors.

Title
Introduction
Body
Conclusion

The urgency of combating climate change

Climate change has already caused significant damage to our planet, and its effects are becoming more severe each year. We must take immediate action to combat this global crisis. Rising temperatures, melting ice caps, and increasing natural disasters have all been linked to human activities that produce greenhouse gases.

Burning fossil fuels has led to increased greenhouse gas emissions, which trap heat in the atmosphere and contribute to global warming. However, many communities have successfully reduced their carbon footprints by adopting renewable energy sources and promoting conservation efforts. For instance, cities that have invested in solar and wind energy have seen a significant decrease in their carbon emissions.

By switching to electric vehicles, installing energy-efficient appliances, and reducing waste, we can collectively reduce our impact on the environment. These actions not only help mitigate climate change but also lead to cleaner air and healthier living conditions.

If we take similar actions on a larger scale, we can mitigate the worst effects of climate change. The time to act is now before it is too late to reverse the damage we have caused. Our future depends on the steps we take today.

Write your essay to participate in the competition and persuade people to take care of the environment and stop climate change.

Project

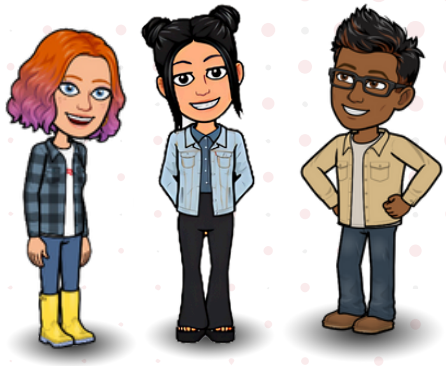
Get in small groups and search the web to find information about Uruguay.

1. How has Uruguay achieved a high percentage of its electricity from renewable sources? Which key policies have facilitated this transition?
2. What are the main arguments for and against Uruguay's heavy reliance on renewable energy, particularly in terms of economic sustainability and energy security?
3. How does Uruguay's renewable energy infrastructure, including wind farms and solar parks, contribute to the country's overall energy mix? Which are the future plans for expansion?
4. What role does public opinion play in Uruguay's renewable energy policies? How have local communities been affected by and involved in renewable energy projects?
5. How does Uruguay's experience with renewable energy compare to global trends? What can other countries learn from Uruguay's successes and challenges in the green energy sector?

Share your findings with the rest of the class and **compare** them.

9 Connecting Math, Technology and Finance

Nico, Emma and Camila are discussing the intersection of Math, Technology and Finance. Is that possible?



Read this extract and **answer**.

a. How are algorithms used in finance?
b. What services do FinTech companies provide?
c. How does blockchain technology benefit financial transactions?
d. What is the potential future impact of the intersection of these fields?

The intersection of math, technology and finance is shaping the future of the financial industry. Algorithms and mathematical models are used to predict market trends and manage risks. FinTech companies leverage technology to provide innovative financial services, from mobile banking to investment platforms. Blockchain technology ensures secure and transparent transactions, reducing the risk of fraud. As these fields continue to evolve, their collaboration will lead to more efficient and effective financial solutions.

What is the connection among math, technology and finance?
Complete this Venn Diagram with your ideas.

Read the text and **answer**.

1. How do financial institutions use algorithms to predict market trends?
2. What is algorithmic trading, and how does it work?
3. How does technology help improve the accuracy of financial market predictions?
4. What are some benefits of using algorithms in finance?
5. Can you think of any potential drawbacks or limitations of using algorithms in finance?

The role of algorithms in Financial Market Predictions

In the world of finance, technology plays a crucial role in making decisions about investments and managing money. One of the most significant tech advancements is the use of algorithms. An algorithm is a set of rules or instructions that a computer follows to solve a problem.

Financial institutions use algorithms to predict market trends. These algorithms are based on mathematical models that analyze vast amounts of data, including past market behavior, economic indicators, and news events. By processing this data, the algorithms can identify patterns and make predictions about future market movements.

For example, a mathematical model might use historical stock prices to identify trends that could indicate whether a stock is likely to rise or fall. The algorithm then uses this information to make automated trading decisions. This process is known as algorithmic trading.

Technology also helps in making these predictions more accurate. With the advent of machine learning, algorithms can learn from new data and improve their predictions over time. This means that as more data is collected, the algorithms become better at predicting market trends.

In conclusion, algorithms and mathematical models are essential tools in finance. They help financial institutions make informed decisions and manage risks more effectively. By using technology to predict market trends, these institutions can navigate the complex world of finance with greater confidence.

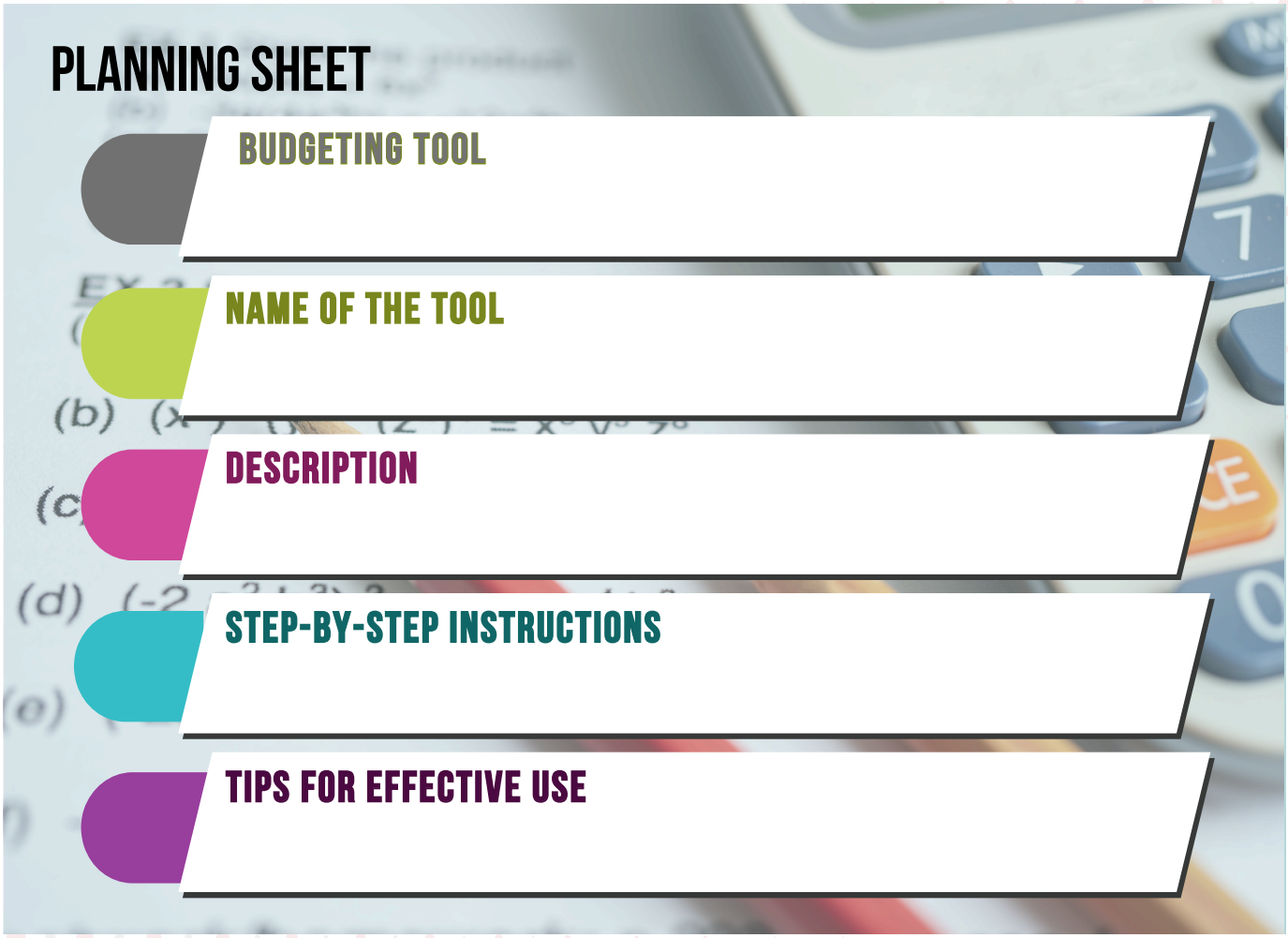
EN **Read** the text again and **fill in the blanks** with the appropriate words in the box.

· indicators · · automated · · market · · better · · essential · · technology · · algorithm · · economic · · learn ·

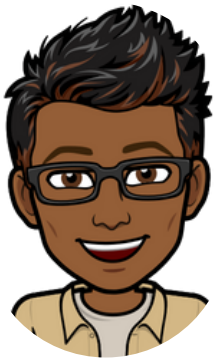
1. In finance, _____ plays a crucial role in decision-making.
2. An _____ is a set of rules a computer follows.
3. Algorithms are used to predict _____ trends.
4. Algorithms analyze data such as past market behavior and _____ .
5. Algorithmic trading is the process of making _____ trading decisions.
6. Machine learning allows algorithms to _____ from new data.
7. As more data is collected, algorithms become _____ at predicting market trends.
8. Algorithms and mathematical models are _____ tools in finance.

How to manage personal finances can become a great issue as we grow older. **Get in small groups** and **identify** a budgeting app or tool that helps manage personal finances.

- Create a detailed report on how to use this tool effectively.
- Include screenshots, step-by-step instructions and tips for maximizing the tool's benefits.
- Present your app to the class, explaining how this technology can improve financial planning.



Nico and his mother have different points of view regarding the management of money and financial issues. His mother argues that technology is constantly changing the way we handle money, but this may not always be a good thing.



Choose one of the following points of view and **write** a short text about it.

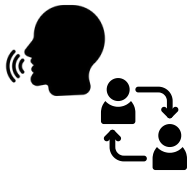
Option A

Technology has revolutionized personal finance, making it easier to track expenses, invest and manage personal budgets with apps and online tools.

Option B

While technology offers benefits, it can also lead to impulsive spending or security risks. They might advocate for a balance between tech and traditional budgeting methods.

Interview one of your friends or relatives at home to know his / her point of view regarding this controversial topic.
Report answers to the rest of the class.



Do you think budgeting apps and online tools have made managing personal finances easier? In what ways have they helped you, or how do you see them benefiting others?

Have you ever encountered any challenges or concerns when using technology for financial management? For example, security risks or impulsive spending triggers.

Do you find it helpful to combine traditional budgeting methods (like pen and paper) with financial technology tools? If so, how do you strike a balance between the two?

Looking back on your financial journey, what advice would you give to someone just starting to manage their money? Would you emphasize technology, traditional methods, or a combination of both?

EN In the report on using a budgeting app or tool, students describe the features and instructions for using the tool.
These are some examples of their descriptions:

- "The app is designed to track expenses and create personalized budgets".
- "Detailed reports on spending patterns are generated by the tool".
- "Recommendations for improving financial management are provided by the app".

Remember to focus on the action or process rather than the person performing the action when describing the functionality of the financial technology tool.
Write some more sentences describing that app or other apps you can use for budgeting.

EN Combine the following pairs of sentences using "**who**," "**which**," or "**that**" as appropriate.

1. *Algorithms are used in finance. They help predict market trends.*
   Algorithms ... _____

2. *FinTech companies provide innovative financial services. These services include mobile banking and investment platforms.*
   FinTech companies provide innovative financial services ... _____
   _____

3. *Blockchain technology ensures secure transactions. It reduces the risk of fraud.*
   Blockchain technology ... _____

4. *The intersection of math, technology, and finance is shaping the future. This intersection leads to more efficient financial solutions.*
   The intersection of math, technology, and finance ... _____
   _____

Project moving to study!

You graduated high school and it’s time to move to study in another city. This is an exciting opportunity, but moving and starting university comes with financial considerations. In this project, you'll create a realistic budget to estimate your expenses.

1 Research costs

- **Living expenses:** Research the average cost of housing (rent, utilities) in the city where your college is located. Think about additional living expenses like groceries, transportation, and phone bills. Consider different housing options, like apartments, student dorms or shared housing, and research their typical costs.
- **University supplies and textbooks:** Find out what textbooks and course materials are required for your classes. Research the costs associated with these items.

2 Estimate your income

- **Savings:** How much money have you saved up to help cover your expenses? How much money do you receive from your family?
- **Part-time job:** Will you be able to work part-time while you study? Estimate how much you can earn per month. Consider job opportunities or explore potential part-time jobs near your college.
- **Financial aid:** Research scholarships, grants, or student loans (though remember, in Uruguay, public university education is generally free!). Look into scholarships specific to your field of study or academic achievements.

3 Create a budget worksheet

- List all your estimated income sources in one column.
- List all your estimated expenses in another column.
- Be sure to include both fixed expenses (rent, utilities) and variable expenses (groceries, entertainment).
- Subtract your total expenses from your total income.

4 Analyze and adjust

- If your expenses exceed your income, you'll need to make some adjustments.
- Consider finding cheaper housing (shared apartment), reducing non-essential spending like entertainment or eating out, or increasing your income through a higher-paying part-time job.
- Use online budgeting tools or apps to help you create and track your budget.
- Remember, this is an estimate. Be prepared to adjust your budget as needed throughout the semester.

Project Financing your university, dreams... and beyond!

Financing university education in Uruguay can still involve some costs, even though public education is free. Research different scholarship and alternative financing options and compare their pros and cons.

1 Explore scholarship options

- Research possible scholarships for students.
- Look for scholarships offered by alumni organizations, professional organizations, or industry associations related to your major.
- Consider creating a scholarship profile on a scholarship-matching website to connect with potential scholarship opportunities.

2 Research alternative funding options

- **Part-time jobs:** Explore options for part-time jobs that fit your schedule and academic commitments.
- **Family support:** Discuss potential financial support from family members.
- **Student loans (if applicable):** While public university education is free, research private institutions or specialized programs may require tuition fees. Research student loan options, comparing interest rates, repayment terms, and eligibility requirements.

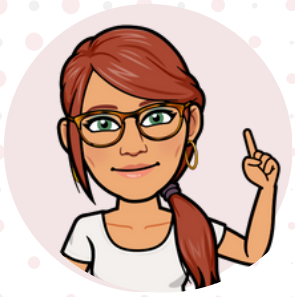
3 Create a comparison chart

- **Create a chart** comparing scholarships, part-time work, family support, and student loans (if applicable).
- **Include** factors such as:
  - Eligibility requirements
  - Application process
  - Amount awarded (scholarships) vs. income potential (part-time work/family support) vs. interest rate and repayment terms (loans)
  - Need-based vs. merit-based (scholarships)
  - Include a brief explanation of the pros and cons of each option.

4 Make an informed decision

- Based on your research, decide which financing option(s) are right for you. Consider factors like your financial situation, academic performance, future career goals, and potential earning potential after graduation.

10 From medical innovations and robots to rockets: The Power of STEAM



With STEAM the possibilities are endless!
Let's explore the exciting world of innovation!
Are you ready?

Nico created a vocabulary check-up for the class. **Match** key terms and definitions.

1	gene editing	**a**	The study of celestial objects and space.
2	trend	**b**	Progress or development in a particular field.
3	galaxy	**c**	A general direction in which something is developing.
4	satellite	**d**	The use of robots to perform surgical procedures.
5	Astronomy	**e**	An artificial body placed in orbit around the earth or moon.
6	futurism	**f**	A system of millions or billions of stars, together with gas and dust.
7	advancement	**g**	A belief in the future and the development of new technologies.
8	robotics in surgery	**h**	The alteration of genes in a living organism.

1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐

Here are more key terms and definitions.
Fill in the blanks with the words given.

object - organisms- future - travel - treatment - planets -assignment - methods

prediction	A statement about what will happen in the _____.
orbit	The path of an _____around a star, planet, or moon.
astronaut	A person trained to _____in a spacecraft.
biotechnology	The use of living systems and _____ to develop products.
Solar System	The collection of eight _____and their moons in orbit around the sun.
mission	An important _____carried out for scientific or military purpose.
innovation	The introduction of new ideas,_____, or products.
telemedicine	The remote diagnosis and _____of patients.

Get in pairs. **Classify** the key terms from the previous activities in these categories.

ASTRONOMY	BIOTECHNOLOGY	ROBOTICS IN SURGERY	SPACE EXPLORATION

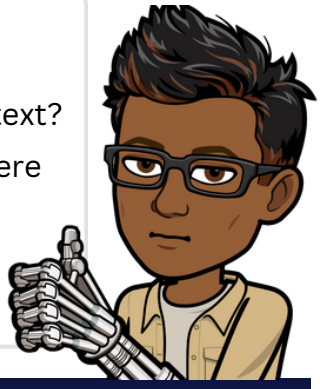
Then, for each field, **answer** these questions.

- What are the key aspects of each STEAM field?
- How are these fields interconnected?
- What are some recent advancements or innovations in these fields?

Get in small groups and **share** your ideas.

Nico found an article online. **Read** and **answer**.

1. According to the text, what does the acronym STEAM stand for?
2. How has STEAM contributed to medical advancements?
3. What significant space exploration achievement is mentioned in the text?
4. Apart from medicine and space exploration, name one other area where STEAM has made an impact.
5. Why is the integration of STEAM disciplines considered important for the future?



From Medical Marvels to Martian Missions

The power of STEAM

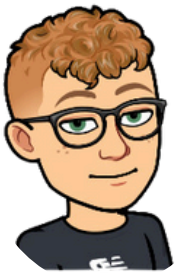
In today's rapidly evolving world, the integration of Science, Technology, Engineering, Arts, and Mathematics (STEAM) has become a driving force behind many incredible innovations. From life-saving medical advancements to ambitious space exploration missions, the power of STEAM is transforming our understanding of the universe and improving our quality of life.

One remarkable example of STEAM in action is the field of medical technology. Combining scientific knowledge, engineering principles, and artistic design, researchers have developed cutting-edge medical devices and treatments that have revolutionized healthcare. Robotic surgical systems, for instance, allow surgeons to perform complex procedures with unprecedented precision, minimizing trauma and speeding up recovery times for patients.

Beyond medical marvels, STEAM has also played a pivotal role in our quest to explore the cosmos. The successful landing of the Perseverance rover on Mars in 2021 was a testament to the collaborative efforts of scientists, engineers, and mathematicians. This ambitious mission not only expanded our understanding of the Red Planet but also paved the way for future human exploration of deep space.

However, STEAM's impact extends far beyond the realms of medicine and space exploration. From the design of energy-efficient buildings to the creation of immersive virtual reality experiences, the integration of these disciplines has unlocked new frontiers of innovation and creativity.

As we continue to navigate the challenges of the 21st century, the power of STEAM will undoubtedly play a crucial role in shaping our future. By fostering interdisciplinary collaboration and nurturing a diverse range of talents, we can unlock the full potential of STEAM and create a world of endless possibilities.



Freddie has an opinion about the future of STEAM fields so he recorded a podcast to express his ideas.
Listen to him and **answer.**

1. What is the main topic discussed in the podcast?
2. According to Freddie, which are two advancements in healthcare made possible by future technology?
3. How will virtual and augmented reality change the way we communicate in the future?
4. What are some potential challenges mentioned regarding future technological advancements?

Get in pairs and **compare** your answers.

EN **Rewrite** the following sentences using the beginnings provided.

1. Scientists develop new medical devices using STEAM principles.
   - New medical devices _____.
2. Engineers designed the Perseverance rover for the Mars mission.
   - The Perseverance rover _____.
3. Researchers are creating immersive virtual reality experiences.
   - Immersive virtual reality experiences _____.
4. The team will launch the new satellite next year.
   - The new satellite _____.

In the discussion on the key aspects and interconnections of different STEAM fields, you can use cause-and-effect relationships to explain how these fields are related and how advancements in one field can impact others.

Read the following statements and **identify t**he cause and effect. You can choose one color to identify the cause and another color to identify the effect in each statement.

a Advances in biotechnology have led to the development of innovative medical treatments, which have in turn improved patient outcomes.

b The integration of engineering principles and artistic design has enabled the creation of more user-friendly and aesthetically pleasing medical devices.

c The success of space exploration missions, such as the landing of the Perseverance rover on Mars, has been made possible by the collaboration of scientists, engineers, and mathematicians.

Inés asked her classmates to share their ideas through a speaking activity.

Choose a specific STEAM field (e.g., astronomy, robotics, biotechnology) and **research** its recent advancements and innovations. **Get in small groups** and **present** your findings.

Project Incorporating multiple STEAM disciplines

Develop and present a project that incorporates multiple STEAM disciplines, showing a specific way future technology could impact your life. Briefly describe it.

Rúbrica de Proyectos

	Primeros pasos (1)	Estás en el camino (2)	Estás llegando a la meta (3)	Has llegado a la meta (4)
Silueta textual	El texto que has presentado se puede ver como un solo cuerpo. Las oraciones se encuentran incompletas. Las ideas están entremezcladas y no se ve una diferenciación en párrafos. No se ven las diferentes partes del texto solicitado.	El texto que has presentado diferencia ideas pero no se diferencia en párrafos o se realizan párrafos pero se entremezclan las ideas. No se encuentran diferenciadas las partes del texto.	El texto posee párrafos bien diferenciados. No existen problemas de mezcla de ideas entre párrafos. Sin embargo, no se encuentran diferenciados las diferentes partes del texto solicitado.	En el texto has incluido oraciones bien diferenciadas. Se puede ver que has construido párrafos. Se encuentran diferenciadas las diferentes partes del texto, ya sea a través de subtítulos o a través de las diferenciación en párrafos separados por un espacio.
Contenido	Si bien es cierto que tienes idea de lo que se te ha solicitado, no tratas los temas que se establecen en la consigna de trabajo. Te expandes en ideas que no están relacionadas con el tema solicitado.	Has tenido en cuenta menos de la mitad de los temas que se te han solicitado en la consigna. O has tratado todos los temas pero has logrado desarrollar, argumentar o ejemplificar menos de la mitad de ellos.	Has tenido en cuenta todos los temas de la consigna y argumentas, describes y ejemplificas más de la mitad de ellos, aunque no todos. Puede suceder que trates más de la mitad de los temas y que todos estén fundamentados, descriptos o ejemplificados. Sin embargo no has hecho dicho trabajo con todos los elementos solicitados en la consigna.	Has tenido en cuenta todos los temas que forman parte de la consigna de trabajo. Cada uno ha sido desarrollado, es decir, no solo se nombra sino que agregas ideas referidas al mismo. Además, el tema posee argumentos o ejemplos que ilustran las ideas. Cada párrafo contiene un tema concreto y no una mezcla de los mismos.
Lenguaje	Las ideas del proyecto no se encuentran conectadas de manera de lograr una comunicación efectiva. Los errores de lengua y pronunciación han impedido la transmisión de tus ideas.	Los errores de lengua hacen que tus ideas no resulten claramente expresadas por momentos. Existen algunos errores de lengua y pronunciación que hacen que la transmisión de tus ideas sea poco clara.	El proyecto ha sido presentado en su formato escrito y oral de forma clara. Tus errores no interfieren con la presentación del proyecto, aunque algunos de ellos le quitan fluidez.	El proyecto ha sido presentado en su formato escrito y oral de forma clara y fluida. Se nota la preparación para la presentación, es decir tu audiencia logra comprender el mensaje que quieres comunicar.

	Primeros pasos (1)	Estás en el camino (2)	Estás llegando a la meta (3)	Has llegado a la meta (4)
Presentación	Al realizar tu presentación te has parado detrás del material. ¿Crees que has mantenido contacto visual con tus compañeros como para involucrarlos en la presentación? Hablas bajo, piensa en tus compañeros del fondo que también deben y quieren escucharte.	Al presentar tu proyecto te diriges a la clase por momentos y en otras ocasiones pierdes contacto visual con tus compañeros. La clase debe poder verte y oírte de forma clara para así comprender todo lo que tratas de comunicar.	Al momento de exponer te paras de tal manera que logras contacto visual y así conectar con tus compañeros la mayor parte del tiempo. Tu voz es clara pero aún necesitas buscar más estrategias para transmitir tu mensaje.	Durante tu presentación te paras al frente de la clase y te desplazas manteniendo contacto visual con tus compañeros, involucrándose en tu presentación. Hablas fuerte y claro demostrando seguridad, ya que no lees ni dudas al expresar tus ideas.
Elementos paralingüísticos	Haber incluido imágenes relacionadas al contenido de tu presentación, tal como habíamos acordado en la negociación de las pautas de trabajo, hubiese hecho que el contenido de tu proyecto fuera más claro y atractivo.	Has usado imágenes que si bien están relacionadas al contenido de lo que has presentado, lo podrías haber usado como ayuda para que tus compañeras/os y profesoras/es logren entender con mayor claridad lo que has planteado.	Has usado imágenes relacionadas al contenido de lo que has presentado. Debes tratar de llegar a un balance entre cantidad de imágenes incluidas, y su relación con la información planteada. Las imágenes no siempre ayudan a entender o a hacer atractivo tu trabajo.	Las imágenes incluidas han permitido que tus compañeras/os, tus profesora/es y cualquier persona que vea tu trabajo, pueda entender lo que estás compartiendo con ellos, además de hacer el trabajo más atractivo.
Compromiso y ética hacia el trabajo	Has presentado tu trabajo incluyendo contenido interesante aunque no está relacionado al problema inicial.	Has incluido ideas de otras fuentes sin haber reflexionado sobre ellas o haber citado al autor.	Has presentado tu trabajo incluyendo contenido pertinente. Has incluido ideas de otras fuentes sin haber reflexionado sobre ellas o haber citado al autor. Has presentado tu trabajo incluyendo contenido pertinente. Has incluido ideas de otras fuentes aunque no en todos los casos las has citado o has reflexionado sobre ellas.	Has presentado tu trabajo incluyendo contenido pertinente. Lo has presentado usando tus propias palabras, intercalando reflexiones personales sobre el contenido que has incluido, e incluyendo citas sobre reflexiones de entendidos en la temática.

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