

# Inclusive and accessible scientific computing in the Jupyter ecosystem

Stephannie Jimenez Gacha

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Quansight Labs



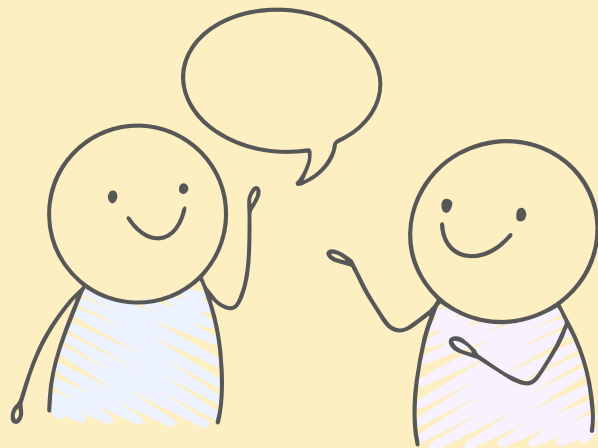
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**01** Web accessibility

**02** Jupyter and  
accessibility

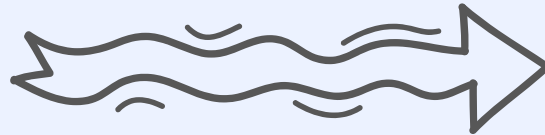
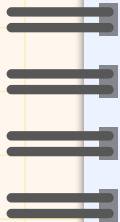
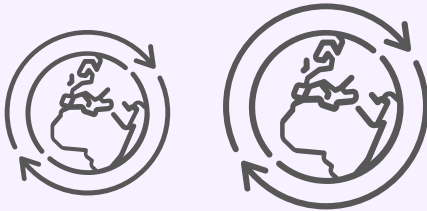
**03** Tips and tricks

**04** Useful resources



01

# Web accessibility



“The power of the Web is in its universality. Access by everyone regardless of disability is an essential aspect.”

—Tim Berners-Lee, W3C Director



# What is Web accessibility?



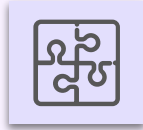
Navigate



Interact



Perceive



Understand



Contribute

# The four principles of accessibility



Perceivable



Operable



Understandable



Robust

# Accessibility is important for communities



## Web is essential for everyone!

Education, employment, government, commerce, recreation, ...



## Access is a fundamental right

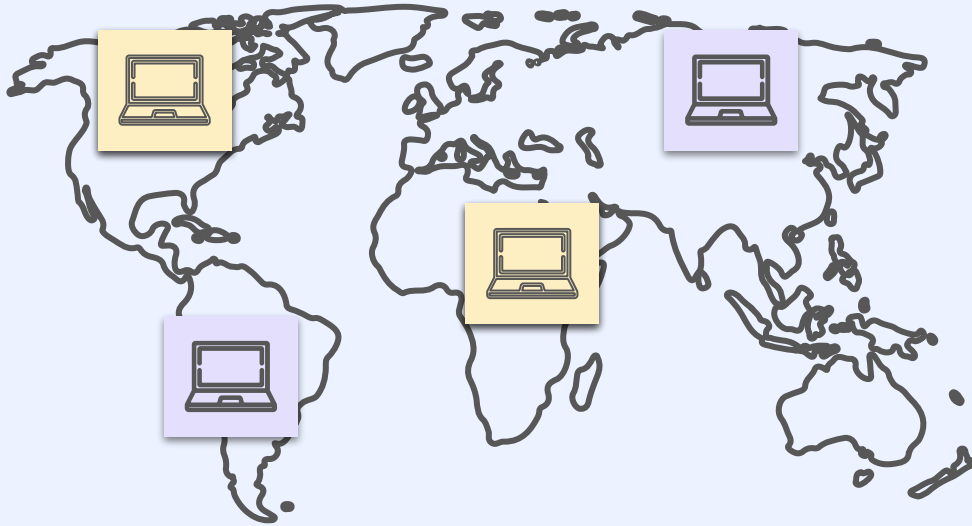
Less barriers to print, audio, and visual media are easily accessible



## Social inclusion

Older people, people in rural areas, people using different devices, ...

# What about open source?



20%

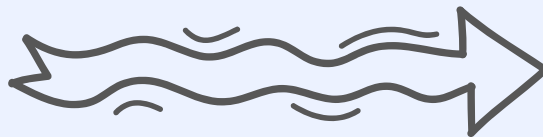
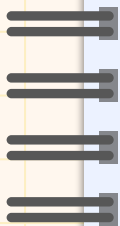
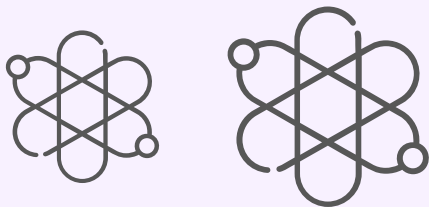
**Disabled  
population**

For every million users, we  
are potentially excluding  
~200 thousand users



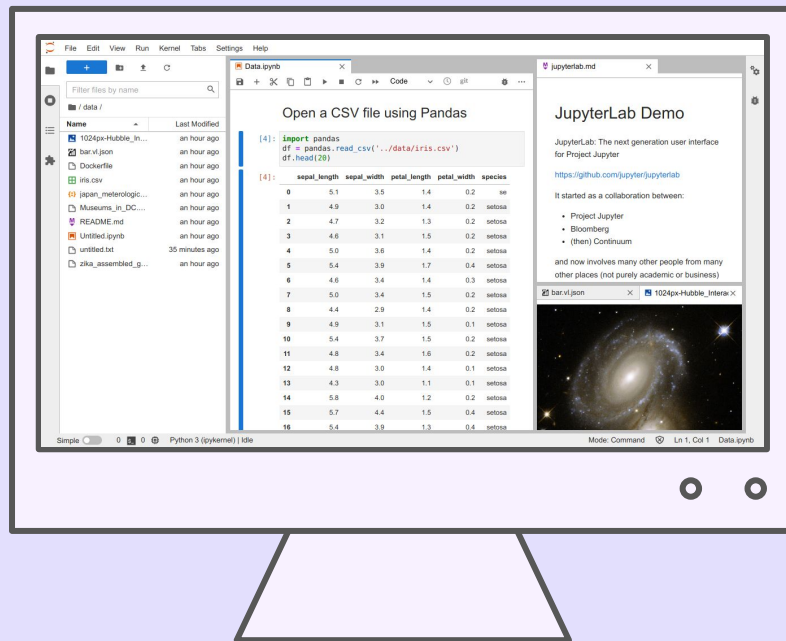
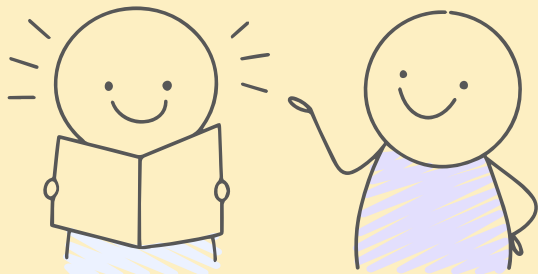
02

# Jupyter and accessibility



# What is the current status?

JupyterLab lacks in implementing Web content accessibility standards, making it unusable for many disabled users



# What are our main goals?

## Automated accessibility testing

Add a framework for automated testing of the JupyterLab UI



## WCAG 2.1 compliance

Support 200% zoom, improve color contrast, add keyboard navigability



## Cross project outreach & community engagement

Perform accessibility events, sprints, documentation and community calls



# Accessibility related improvements



## Automated testing

- Developed GitHub actions to run off-the-shelf accessibility checks
- Add custom regression tests

## Keyboard navigability

- Elimination of Tab traps in most of the main areas of JupyterLab
- Organised and led a keyboard navigation audit

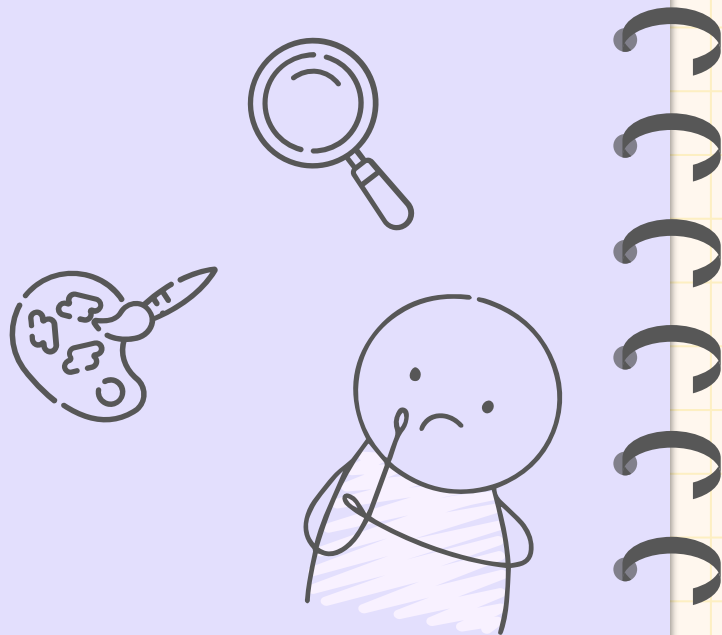
# Accessibility related improvements

## 200% zoom

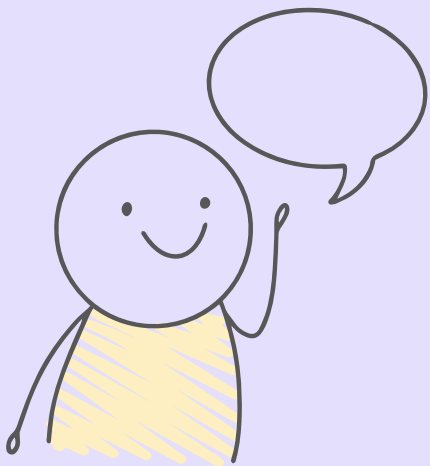
- Audit for the complete JupyterLab UI
- Main menu bar is more accessible after adding a collapsible menu

## Color contrast

- Developed *accessible-pygments* package with 16 WCAG 2.1 compliant themes.
- Theme extension in progress with a set of accessible themes.



# Accessibility related improvements

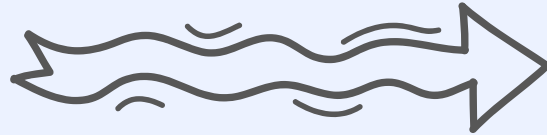
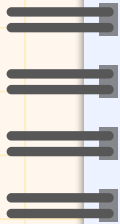
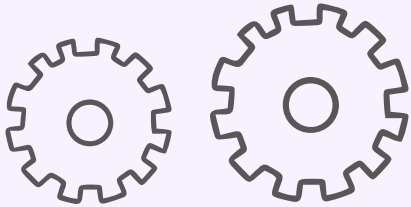


## Cross project outreach and community engagement

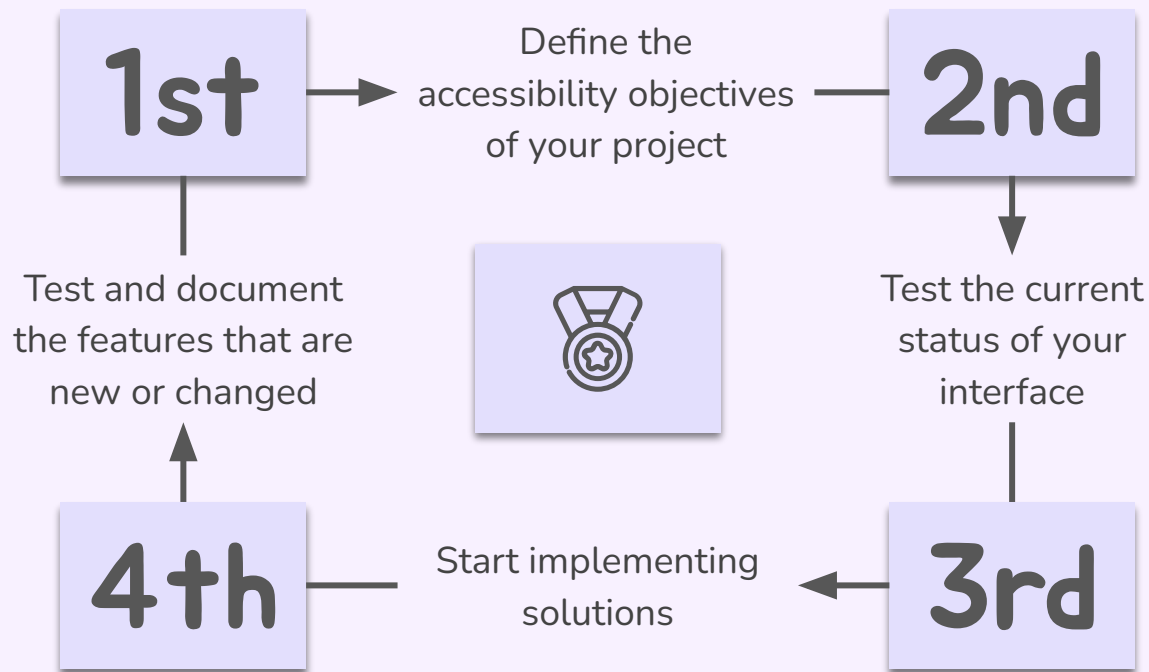
- Bi-weekly Jupyter Accessibility call
- Alt text workshops and jams
- Group audits for keyboard navigation and Jupyter Book UI
- Collaboration with the Space Telescope Science Institute (STScI)
- Accessibility-focused documentation
- Quansight Labs sponsored a 3 month internship project to work fixing zoom issues

03

How to improve  
accessibility in your  
project?



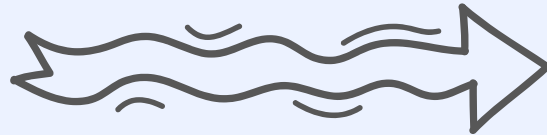
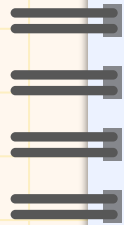
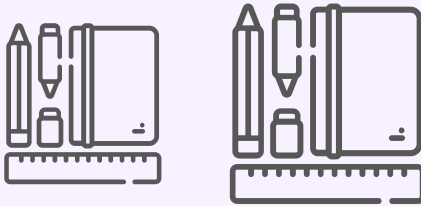
# Accessibility is continuous!





04

## Useful resources



# Resources

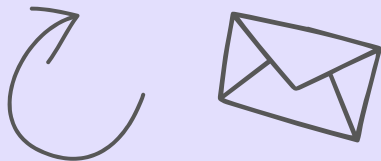
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- [WCAG 2.1 guidelines](#)
- [WAI-ARIA guidelines](#)
- [Tetralogical blog](#)
- [Myth: Accessibility is blind people](#)
- [Jupyter Accessibility Community workshops](#)
- [Jupyter Accessibility resources](#)
- [Jupyter Accessibility meeting minutes](#)
- [JupyterLab Accessible Themes](#)
- [Jupyter Accessibility testing](#)
- [Accessible pygments](#)
- [User testing form](#)



# Are you interested in accessibility?

- Online user testing events
- Notebook authoring sprint this saturday
- Come to our bi-weekly Jupyter Accessibility meetings!





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steff456

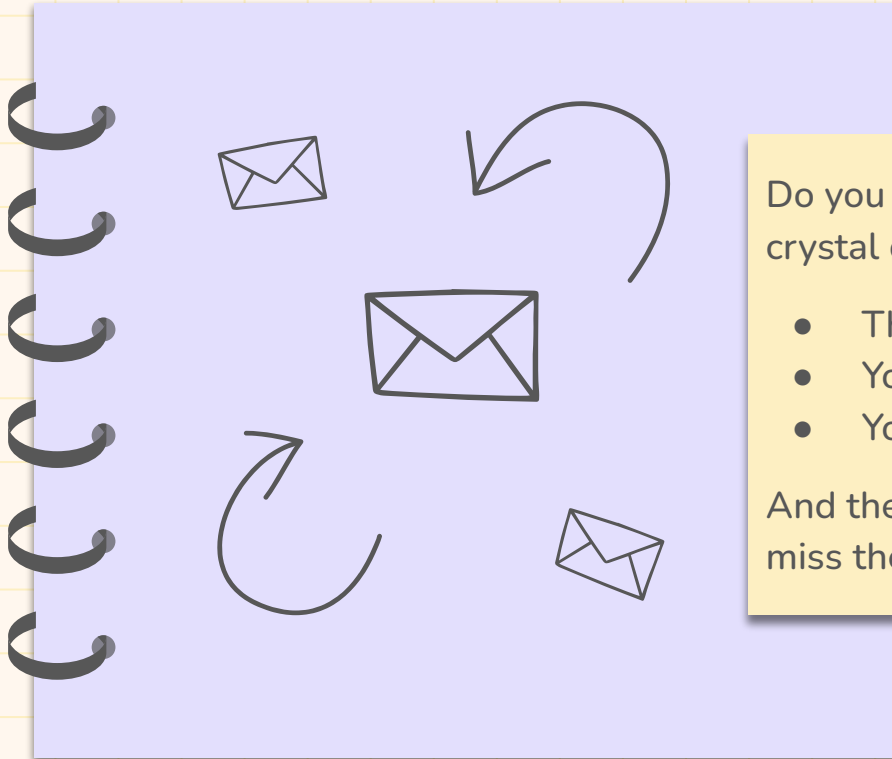


Stephannie Jimenez Gacha



@stephanniejime2

# Examples



Do you know what helps you make your point crystal clear? Lists like this one:

- They're simple
- You can organize your ideas clearly
- You'll never forget to buy milk!

And the most important thing: the audience won't miss the point of your presentation

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<b><u>Used and alternative resources</u></b>	An assortment of graphic resources that are suitable for use in this presentation
<b><u>Thanks slide</u></b>	You must keep it so that proper credits for our design are given
<b><u>Colors</u></b>	All the colors used in this presentation
<b><u>Icons and infographic resources</u></b>	These can be used in the template, and their size and color can be edited
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# Table of contents

**01**

## Theory lesson

You can describe the topic of the section here

**02**

## Features of the topic

You can describe the topic of the section here

**03**

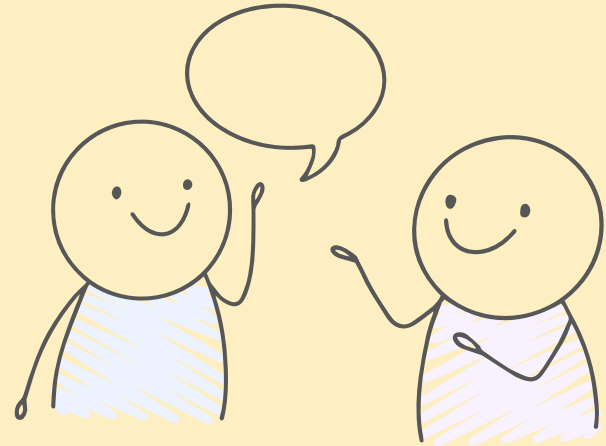
## Tips

You can describe the topic of the section here

**04**

## Practical exercise

You can describe the topic of the section here



# Introduction

Mercury is the closest planet to the Sun and the smallest one in the entire Solar System. This planet's name has nothing to do with the liquid metal, since Mercury was named after the Roman messenger god. Its temperatures aren't as terribly hot as that planet's

Mercury takes a little more than 58 days to complete its rotation, so try to imagine how long days must be there! Since the temperatures are so extreme, albeit not as extreme as in Venus, Mercury has been deemed to be non-habitable for humans



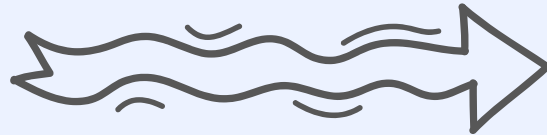
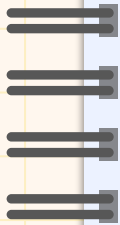
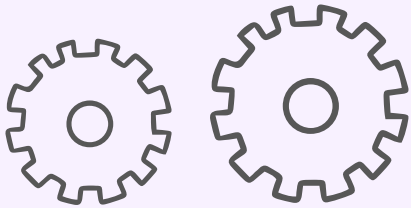




01

# Theory lesson

You can enter a subtitle here if you need it



“This is a quote, words full of wisdom  
that someone important said and can  
make the reader get inspired.”

—Someone Famous



# What is this topic about?



## Mercury

Mercury is the closest planet to the Sun and the smallest of them all



## Venus

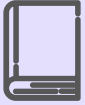
Venus has a beautiful name and is the second planet from the Sun



## Mars

Despite being red, Mars is actually a very cold place

# Features of the topic



## Mars

Mars is actually a extremely cold place



## Venus

Venus has extremely high temperatures



## Jupiter

Jupiter is the biggest planet of them all

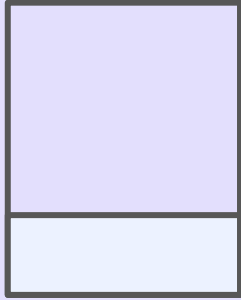


## Saturn

Saturn is a gas giant and has several rings



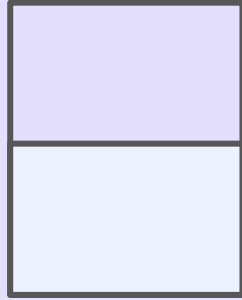
# Some percentages



**25%**

**Mercury**

It's the closest  
planet to the Sun



**50%**

**Venus**

Venus has a very  
beautiful name



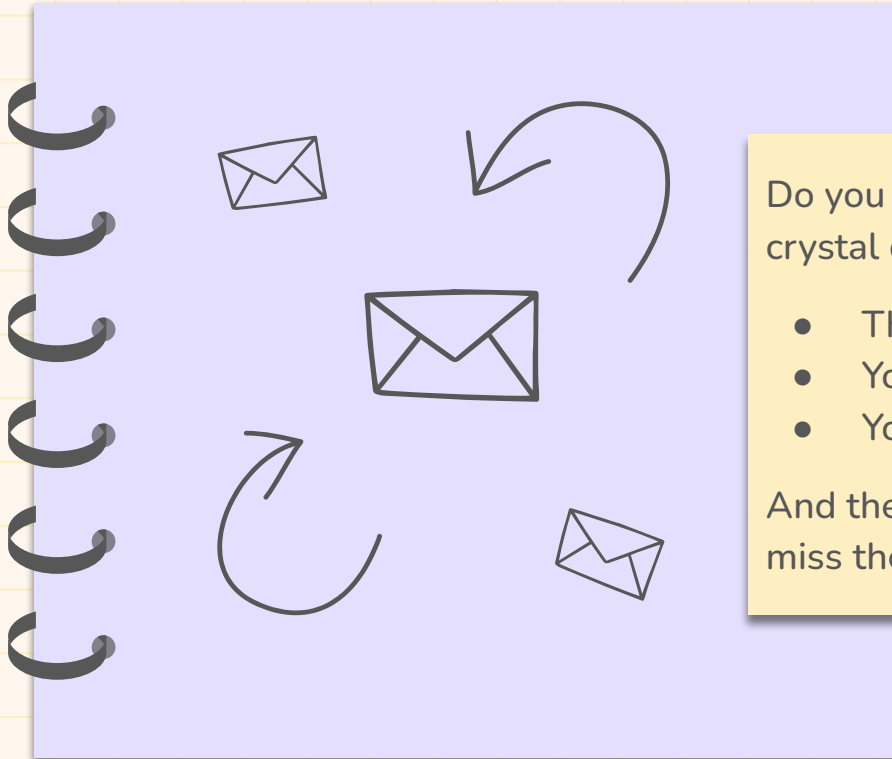
**75%**

**Mars**

Mars is full of iron  
oxide dust



# Examples



Do you know what helps you make your point crystal clear? Lists like this one:

- They're simple
- You can organize your ideas clearly
- You'll never forget to buy milk!

And the most important thing: the audience won't miss the point of your presentation

# Recommendations



## Mars

Despite being red, it's actually a cold place



## Venus

Venus has extremely high temperatures



## Neptune

Neptune is the farthest planet from the Sun



## Mercury

Mercury is the closest planet to the Sun



## Saturn

Saturn is a gas giant with several rings



## Jupiter

Jupiter is the biggest planet of them all



**Awesome words**







**A picture is worth a  
thousand words**

# Try using an image

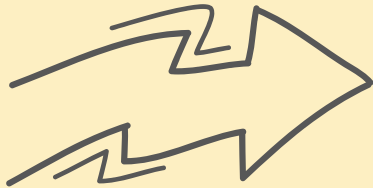


Images reveal large amounts of data, so remember: use an image instead of a long text. Your audience will appreciate it

# Educational methods

## Explanation

Mercury is the closest planet to the Sun and the smallest one in the entire Solar System. This planet's name has nothing to do with the liquid metal



## Steps to follow

**1st**

Mercury is the closest planet to the Sun



**2nd**

Venus is the second planet from the Sun

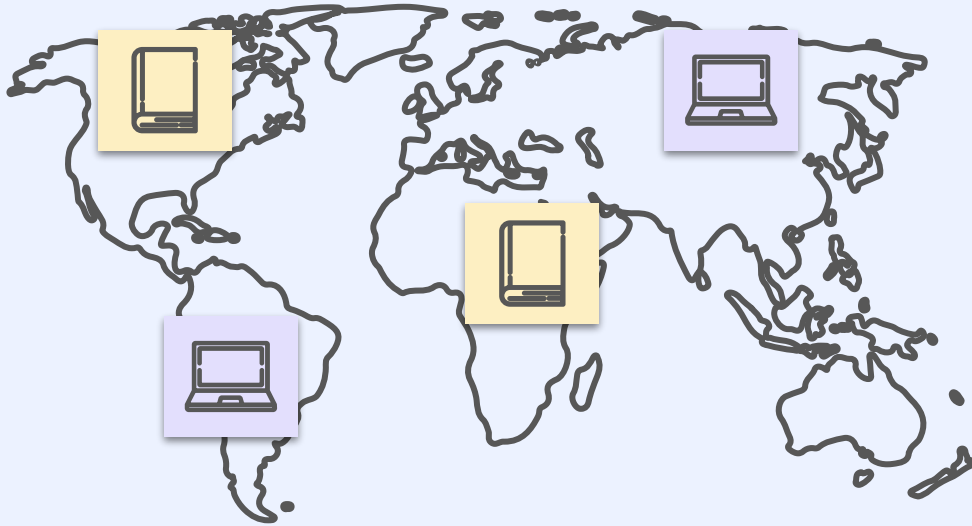


**3rd**

Earth is the planet on which we all live



# Uses and customs



20%

## Mars

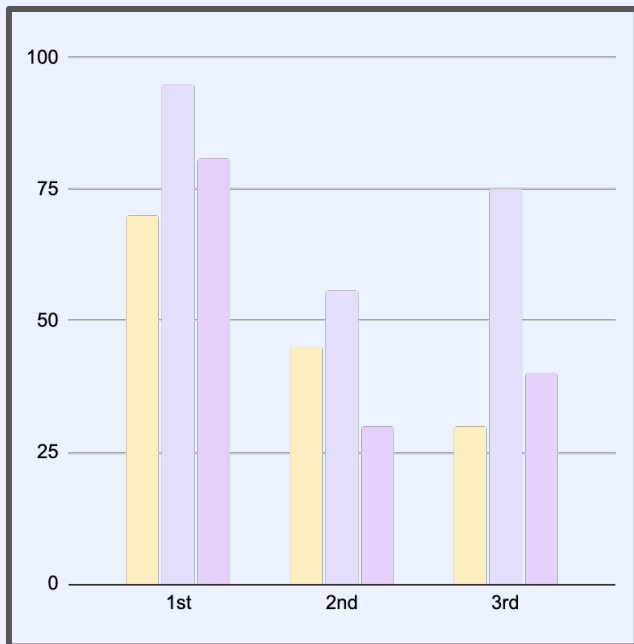
Mars is actually a very cold place

80%

## Venus

Venus is a very hot planet

# Features in percentages



65%

## Saturn

Saturn is one of the gas giants with rings

25%

## Jupiter

Jupiter is the biggest planet of the Solar System

10%

## Mars

Despite being red, Mars is actually a very cold place

Follow the link in the graph to modify its data and then paste the new one here. [For more info, click here](#)

# KWL brainstorming

	What I know	What I want to know	What I learned
01	Venus has a very beautiful name	Jupiter is the biggest planet in the Solar System	Saturn was named after a Roman god
02	Venus is the second planet from the Sun	Jupiter is the fourth-brightest object in the night sky	Saturn is a gas giant and has several rings
03	Venus has extremely high temperatures	Jupiter was named after the Roman god of the skies	Saturn has a high number of moons

# Learning situations

1st

Mars is actually a  
very cold place

2nd

Venus has extremely  
high temperatures

Saturn is a gas giant  
with several rings



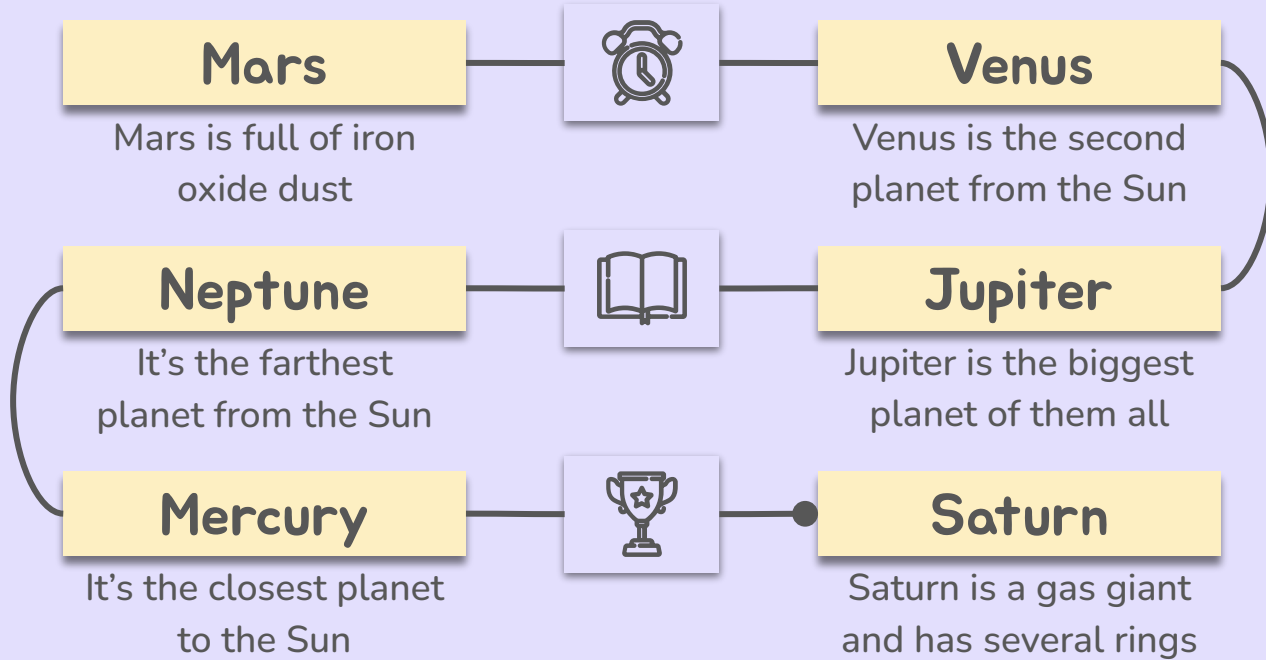
Mercury is a very  
small planet

3rd

4th



# Sequence





# Cause and effect

## Goal

### Environment

Mercury is the closest planet to the Sun

### People

Mars is actually a extremely cold place

### Metering

Saturn is a gas giant and has several rings



### Materials

Venus is the second planet from the Sun

### Methods

Jupiter is the biggest planet of them all

### Machines

Neptune is far away from us

# Question and answer



## Question

Is Mercury the closest planet to the Sun and the smallest one in the Solar System? Note that it's a bit larger than the Moon



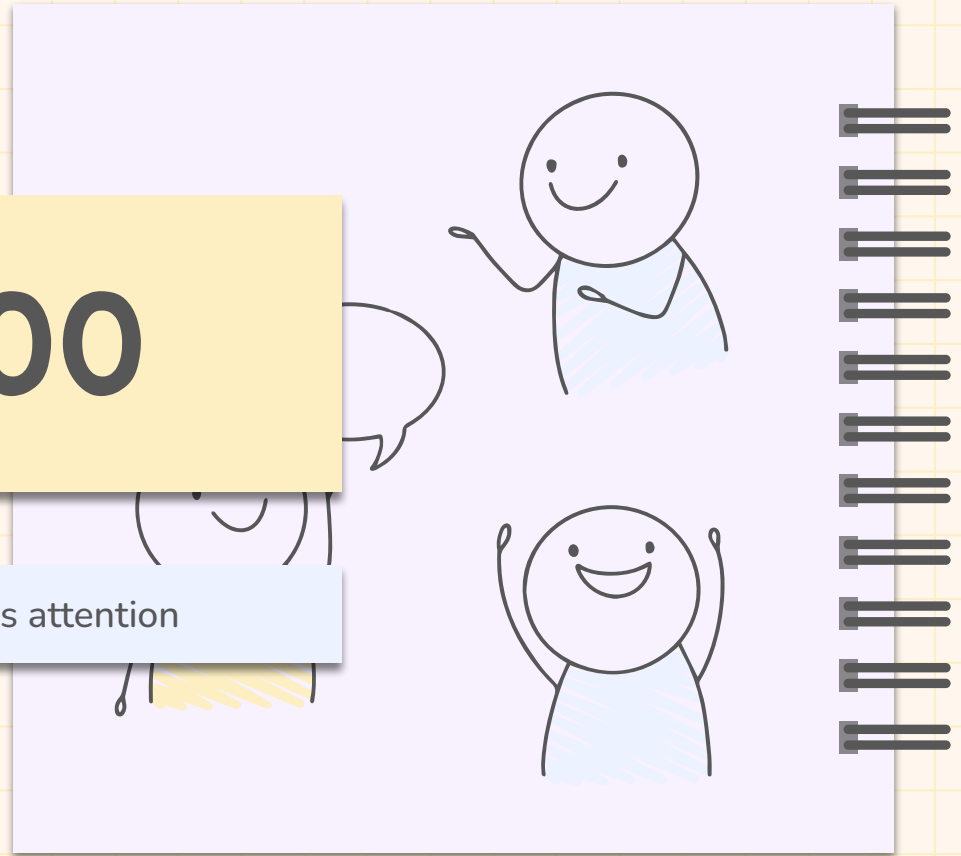
## Answer

Venus has a beautiful name and is the second planet from the Sun. It's hot and has a poisonous atmosphere



# 1,500,000

Big numbers catch your audience's attention



# Timeline



**1st**

**Venus**

Venus is a very  
hot planet



**2nd**

**Neptune**

Neptune is far  
away from us



**3rd**

**Saturn**

Saturn is a  
ringed planet



**4th**

**Jupiter**

Jupiter is the  
biggest planet

# Parts and whole

## The whole object

Mercury is the closest planet to the Sun and the smallest one in the entire Solar System



**Object 1**

**Object 2**

**Object 3**

## Missed parts

Earth is the third planet from the Sun and the only one that harbors life in the System



## Function

Venus has a beautiful name and is the second planet from the Sun. It's terribly hot



# Learning situation example

## Basic knowledge

You can write here...

## Real life connection

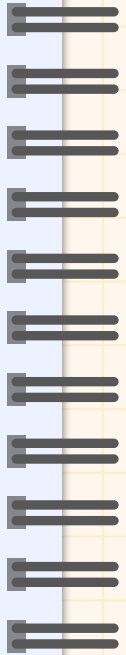
You can write here...

## Justification

You can write here...

## Final product

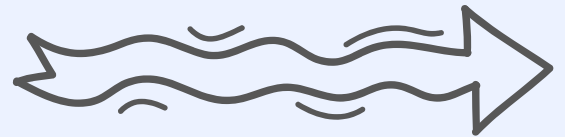
You can write here...



# Learning situation example

## Evaluation criteria

1. You can write here the evaluation criteria...



# Learning situation example

## Operational descriptors

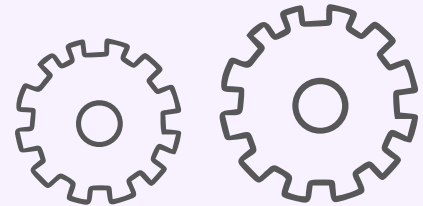
You can write here...

## Specific competencies

You can write here...

## Key competencies

You can write here...





# Learning situation example



**Resources**

You can write here...

**ICT Tools**

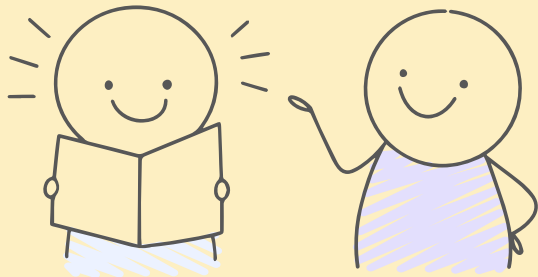
You can write here...

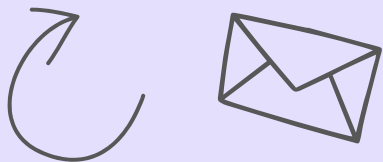
**Project  
fundamentals**

You can write here...

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You can replace the image  
on the screen with your own  
work. Just right-click on it  
and select “Replace image”





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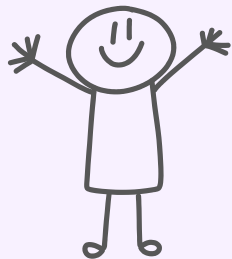
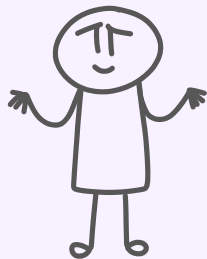


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## Vectors:

- Hand drawn stickman collection



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- Hand drawn style stickman collection
- Realistic spiral for notebooks collection

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Pana



Amico



Bro



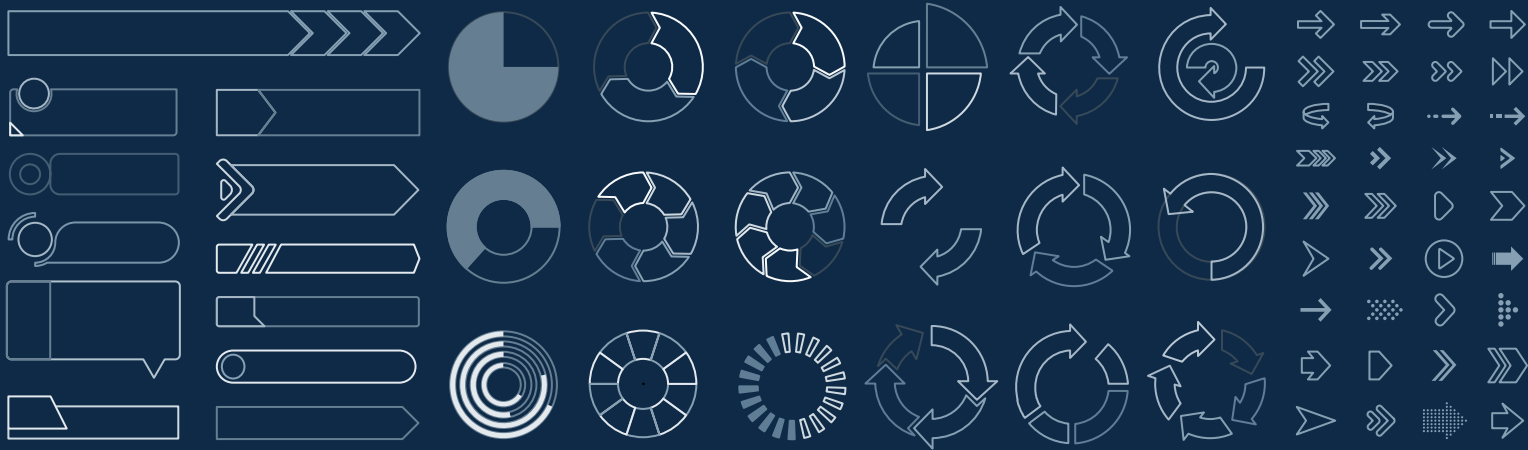
Rafiki



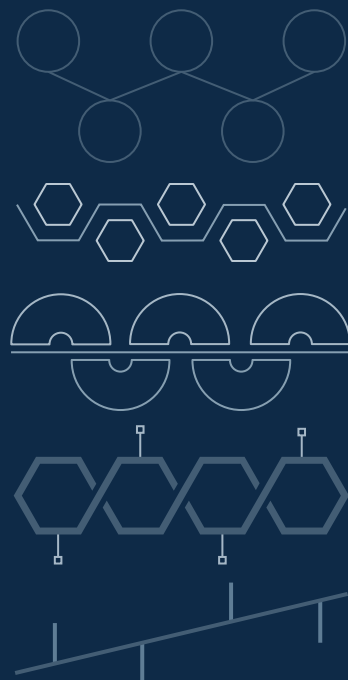
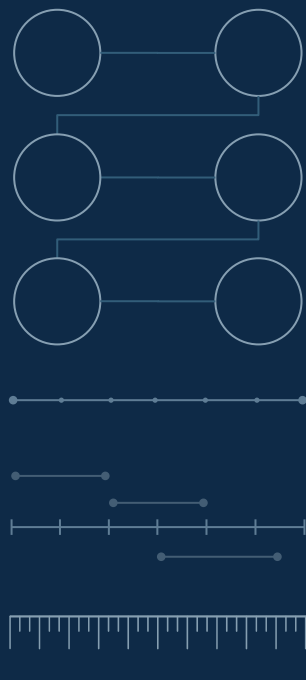
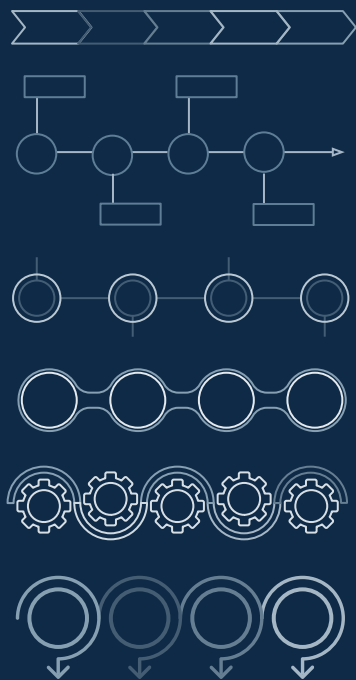
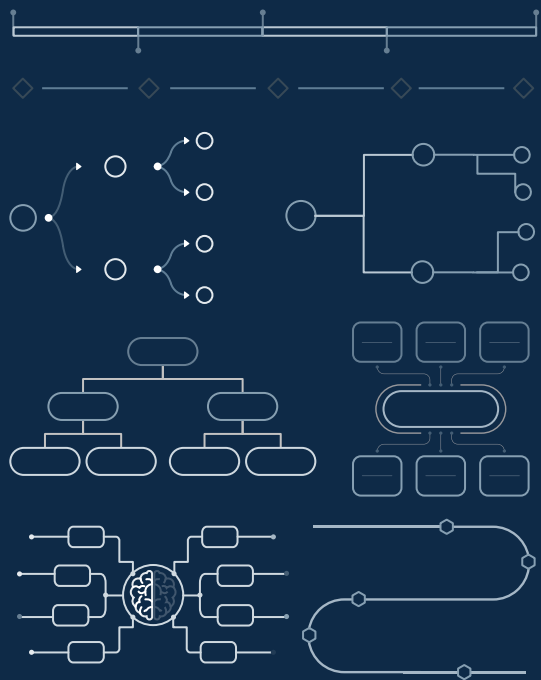
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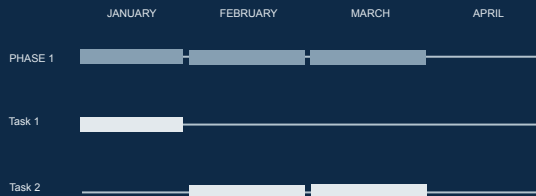
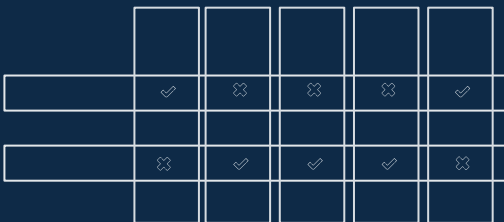
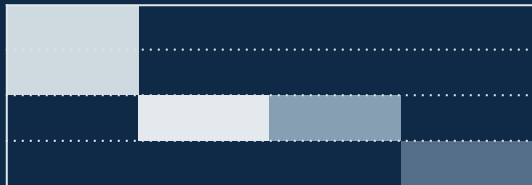
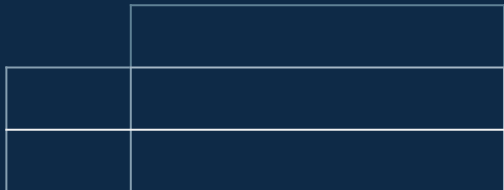
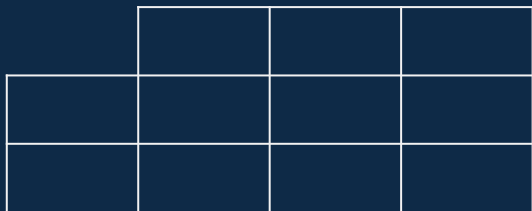
# Use our editable graphic resources...

You can easily **resize** these resources without losing quality. To **change the color**, just ungroup the resource and click on the object you want to change. Then, click on the paint bucket and select the color you want. Group the resource again when you're done. You can also look for more **infographics** on [Slidesgo](#).













# ...and our sets of editable icons

You can **resize** these icons without losing quality.

You can **change the stroke and fill color**; just select the icon and click on the **paint bucket/pen**.

In Google Slides, you can also use **Flaticon's extension**, allowing you to customize and add even more icons.





## Educational Icons



## Medical Icons



# Business Icons



# Teamwork Icons



# Help & Support Icons



# Avatar Icons



# Creative Process Icons



# Performing Arts Icons



# Nature Icons



# SEO & Marketing Icons



