

# Longitudinal Data Analysis

Master of Science in Biostatistics

Here is where your presentation begins

# Contents of this template

You can delete this slide when you're done editing the presentation

<u>Fonts</u>	To view this template correctly in PowerPoint, download and install the fonts we used
<u>Used and alternative resources</u>	An assortment of graphic resources that are suitable for use in this presentation
<u>Thanks slide</u>	You must keep it so that proper credits for our design are given
<u>Colors</u>	All the colors used in this presentation
<u>Icons and infographic resources</u>	These can be used in the template, and their size and color can be edited
<u>Editable presentation theme</u>	You can edit the master slides easily. For more info, click <a href="#">here</a>

For more info:  
[SLIDESGO](#) | [BLOG](#) | [FAQs](#)

You can visit our sister projects:  
[FREEPIK](#) | [FLATICON](#) | [STORYSET](#) | [WEPIK](#) | [VIDEVO](#)

# Table of contents

01

## Data prep

You can describe the topic  
of the section here

02

## Models

You can describe the topic  
of the section here

03

## Interpretation

You can describe the topic  
of the section here

04

## Visualization

You can describe the topic  
of the section here

05

## Softwares

You can describe the topic  
of the section here

06

## Activities

You can describe the topic  
of the section here

# Whoa!

This can be the part of the presentation where you introduce yourself, write your email...

# 01

# Data prep

You can enter a subtitle here if you need it

# Importance of biostatistics

Mercury is the closest planet to the Sun and the smallest one in the entire Solar System. Contrary to popular belief, this planet's name has nothing to do with the liquid metal. Mercury was, instead, named after the famous Roman messenger god Mercurius

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 on Venus, Mercury has been deemed to be non-habitable for humans

# Objectives of the lesson

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

# What is longitudinal data?



## Definition

Mercury is the closest planet to the Sun and the smallest one in the Solar System—it's only a bit larger than the Moon



## Characteristics

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

# Types of longitudinal data



## Panel

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



## Measures

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



## Series

Despite being red, Mars is actually a cold place. It's full of iron oxide dust

# Challenges



## Missing

Mars is actually a very cold planet



## Correlation

Venus has extremely high temperatures



## Variance

Jupiter is the biggest planet of them all



## Applications

Saturn is a gas giant and has several rings

# Data processing

## Cleaning

Mars is actually a very cold planet

## Organization

Venus has extremely high temperatures

## Missing

Neptune is the farthest planet to the Sun

## Description

Mercury is the closest planet to the Sun

## Visualization

Saturn is a gas giant and has several rings

## Models

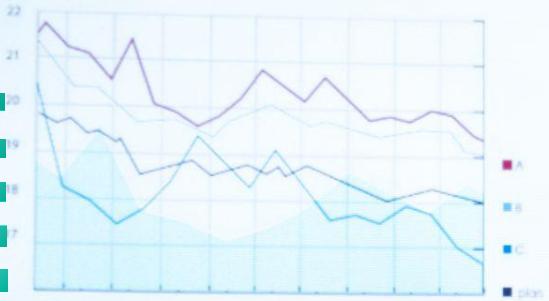
Jupiter is the biggest planet of them all

# Awesome words

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

—Someone Famous

## Business activity of company and subdivisions



## Relative activity of subdivisions of main company



**A picture is worth a thousand words**

# A picture always reinforces the concept

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



98,300,000

Big numbers catch your audience's attention

**9h 55m 23s**

Jupiter's rotation period

**333,000**

The Sun's mass compared to Earth's

**386,000 km**

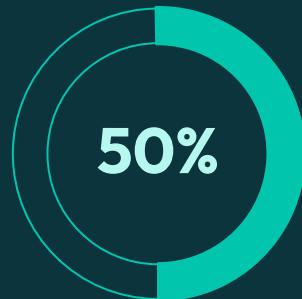
Distance between Earth and the Moon

# Let's use some percentages



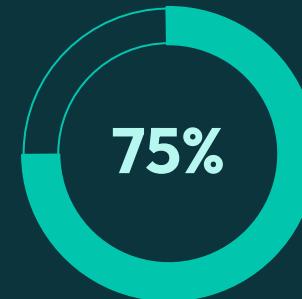
## Mercury

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



## Venus

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

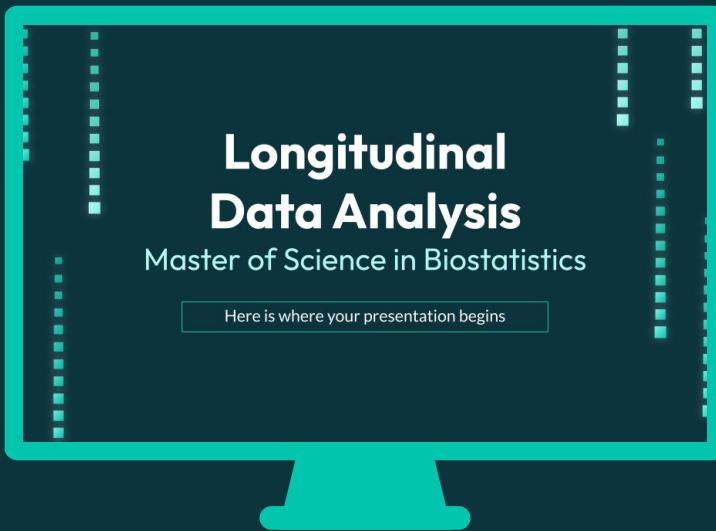


## Mars

Despite being red, Mars is actually a cold place. It's full of iron oxide dust

# Computer mockup

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

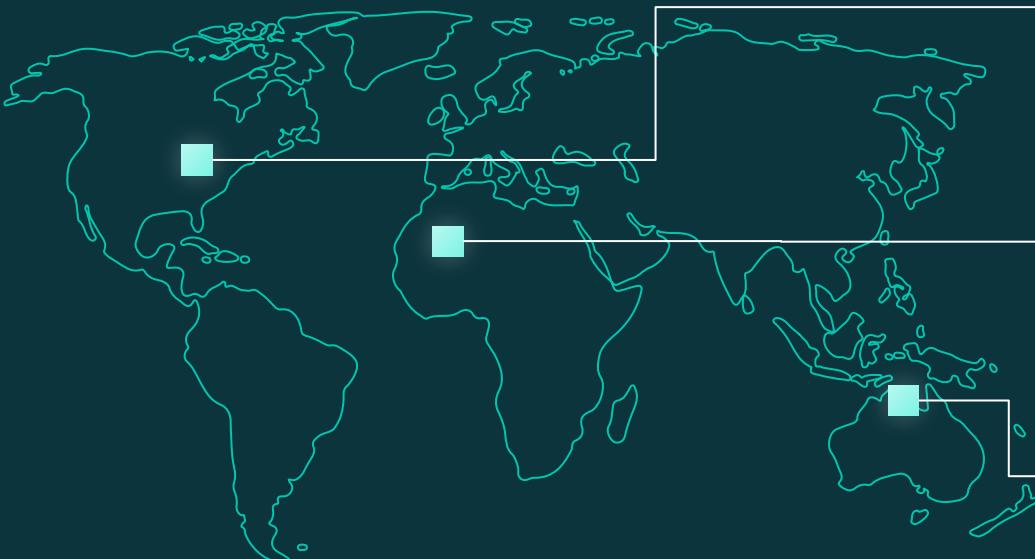




# Phone mockup

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

# Best data analysis centers



## Venus

Venus is the second planet from the Sun

## Mercury

Mercury is the closest planet to the Sun

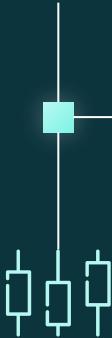
## Mars

Despite being red, Mars is a very cold planet

# Analysis process

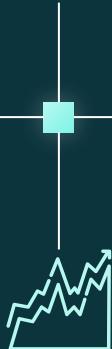
Venus is the second planet from the Sun

## Collection



Despite being red, Mars is a very cold planet

## Protocol



## Transcription

Mercury is the closest planet to the Sun



## Interview

Jupiter is the biggest planet of them all

# Linear mixed model

**Effects**

Mars is a red planet



**Linear**

Venus is a hot planet

**Linear Mixed**

**Regression**

Mercury is very small



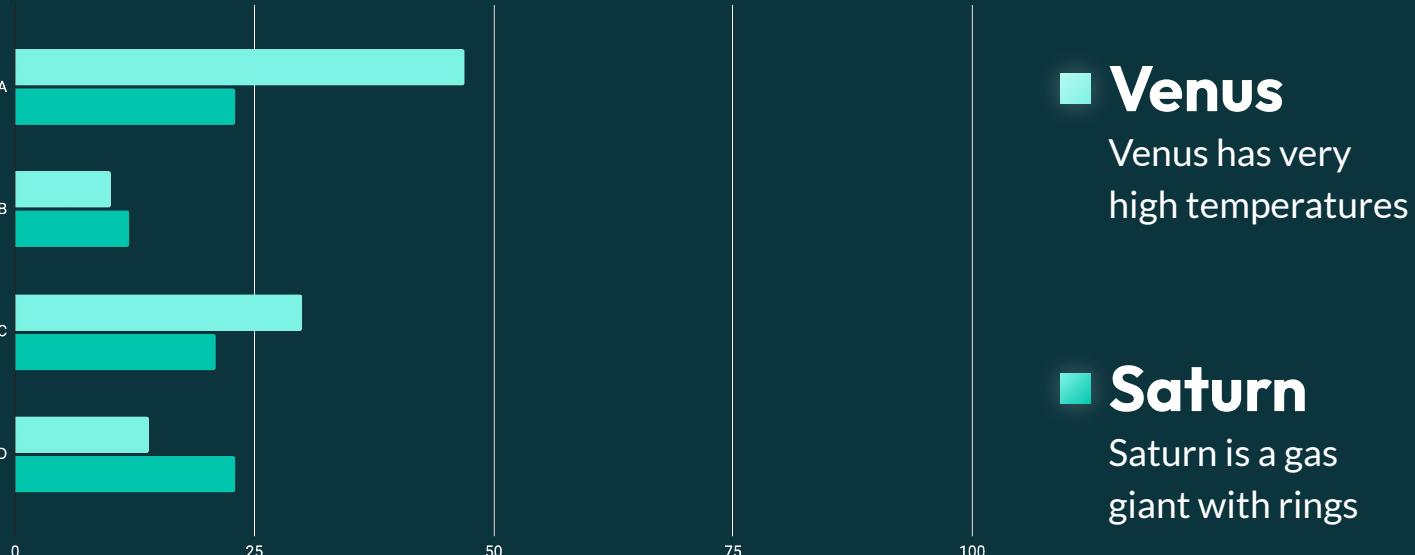
**Model**

Jupiter is a gas giant

# Longitudinal data

Mercury	Team A	Team B	Team C	Team D
Correlation	1	0.65	0.62	0.2
Sig	0	0.005	0.82	0.6
N	16	16	16	16

# Longitudinal data analysis samples



## Venus

Venus has very high temperatures

## Saturn

Saturn is a gas giant with rings

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

# Our team



**Sofia Hill**

You can speak a bit about this  
person here



**John Harris**

You can speak a bit about this  
person here

# Diagram of data sourcing

## Mercury

Mercury is the closest planet to the Sun

## Earth

Earth is the third planet from the Sun

## Mars

Despite being red, Mars is a cold planet

## Venus

Venus is the second planet from the Sun

## Jupiter

Jupiter is a gas giant and a big planet

## Saturn

Saturn is a gas giant and has several rings

## Neptune

Neptune is an ice giant and big

# Schedule/Planner

	<b>Mon</b>	<b>Tue</b>	<b>Wed</b>	<b>Thu</b>	<b>Fri</b>
8-10 am	Lesson 1	Lesson 2	Lesson 3	Lesson 2	Lesson 1
10-12 am	Lesson 2	Lesson 1	Lesson 2	Lesson 3	Lesson 4
2-4 pm	Lesson 3	Lesson 4	Lesson 1	Lesson 4	Lesson 2
4-5 pm	Lesson 4	Lesson 3	Lesson 4	Lesson 1	Lesson 3

# Assignment brief

<b>Qualification</b>	Master of Science
<b>Unit</b>	1
<b>Objective</b>	Mercury is the closest planet to the Sun
<b>Due date</b>	Venus has a beautiful name and is the second planet from the Sun. It's terribly hot, even hotter than Mercury
<b>Scenario</b>	Despite being red, Mars is actually a cold planet
<b>Task</b>	Jupiter is a gas giant and the biggest planet in the Solar System. It's the fourth-brightest object in the night sky

# Rubric

Criteria	Weightings	Descriptors		
		Excellent	Good	Poor
Content	50	Mercury is a small planet	Venus has a beautiful name	Earth is the Blue Planet
Organization	20	Mars is a very cold planet	Jupiter is a gas giant and big	Saturn has several rings
Style	30	Neptune is an ice giant	The moon is a cold planet	Pluto is now a dwarf planet

# Activity 1. Adapting to LMM

Create a **fictitious dataset** with blood pressure measurements of 50 patients over 12 weeks and adapt to a **Linear Mixed Model**

Step 1: Data Prep	Step 2: Model Specification
<ul style="list-style-type: none"><li>• Import dataset</li><li>• Check missing data</li><li>• Transform data if necessary</li></ul>	Define fixed and random effects
Step 3: Model Fitting	Step 4: Interpretation
<ul style="list-style-type: none"><li>• Use LMM functions in your software</li><li>• Specify model formula and estimation method</li></ul>	<ul style="list-style-type: none"><li>• Examine estimated coefficients</li><li>• Check goodness-of-fit</li></ul>
Step 5: Visualization	Step 6: Q&A
Create relevant plots	Discuss findings with peers and instructors

# Activity 2. Selecting the right model

Choose the ideal model for a given dataset

*Dataset: Clinical study data with patient responses to treatment over time*

<b>Steps</b>	You can write your answer here and explain why
<ol style="list-style-type: none"><li>1. Data Exploration</li><li>2. Group Discussion (Research Objectives)</li><li>3. Model Selection (LMM, GEE, etc.)</li><li>4. Model Fitting</li><li>5. Interpretation &amp; Group Presentations</li></ol>	
<b>Key Takeaways</b>	
<ul style="list-style-type: none"><li>• Hands-on experience in model selection</li><li>• Learning from different modeling approaches</li><li>• Practical insights for longitudinal data analysis</li></ul>	

# Longitudinal data software



R

Mercury is the closest  
planet to the Sun



SAS

Venus is the second  
planet from the Sun



**Stata**

Despite being red, Mars  
is actually a cold planet



**SPSS**

Jupiter is a gas giant and  
a very big planet



**HLM**

Saturn is a gas giant and  
has several rings

# Steps for handling missing data

**Venus**



Venus is the second planet from the Sun

Jupiter is a gas giant and a very big planet



**Jupiter**

**Saturn**



Saturn is a gas giant and has several rings

Neptune is an ice giant and big



**Neptune**

# Thanks!

Do you have any questions?

[youremail@freepik.com](mailto:youremail@freepik.com)

+34 654 321 432

[yourwebsite.com](http://yourwebsite.com)



**CREDITS:** This presentation template was created by [Slidesgo](#), and includes icons by [Flaticon](#), and infographics & images by [Freepik](#)

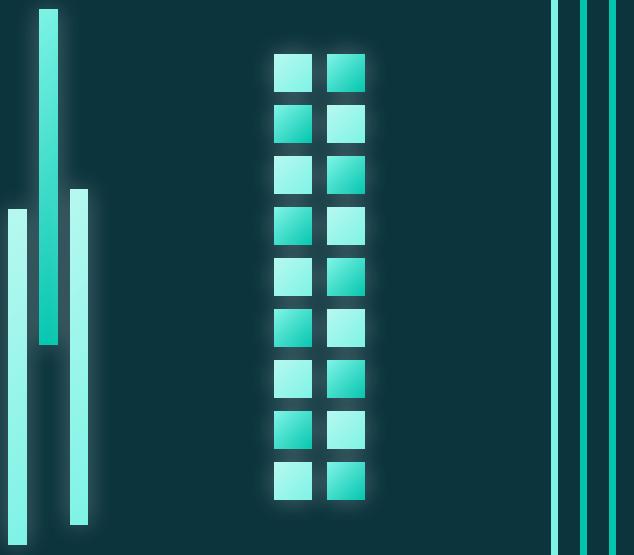
Please keep this slide for attribution

# Icon pack



# Alternative resources

Here's an assortment of alternative resources whose style fits the one of this template:



# Resources

Did you like the resources on this template? Get them for free on these websites:

## Vectors

- [Abstract pixel rain background](#)

## Photos

- [Excited young african businesswoman holding mobile phone and clipboard](#)
- [Positive man with clipboard](#)
- [Black man giving presentation on a meeting](#)
- [Modern and equipped computer lab](#)
- [Business concept with graphic holography](#)

## Icons

- [Icon Pack: Charts & Diagrams | Lineal](#)

# Instructions for use

If you have a free account, in order to use this template, you must credit Slidesgo by keeping the Thanks slide. Please refer to the next slide to read the instructions for premium users.

## As a Free user, you are allowed to:

- Modify this template.
- Use it for both personal and commercial projects.

## You are not allowed to:

- Sublicense, sell or rent any of Slidesgo Content (or a modified version of Slidesgo Content).
- Distribute Slidesgo Content unless it has been expressly authorized by Slidesgo.
- Include Slidesgo Content in an online or offline database or file.
- Offer Slidesgo templates (or modified versions of Slidesgo templates) for download.
- Acquire the copyright of Slidesgo Content.

For more information about editing slides, please read our FAQs or visit our blog:  
<https://slidesgo.com/faqs> and <https://slidesgo.com/slidesgo-school>

# Instructions for use (premium users)

As a Premium user, you can use this template without attributing Slidesgo or keeping the "Thanks" slide.

## You are allowed to:

- Modify this template.
- Use it for both personal and commercial purposes.
- Hide or delete the "Thanks" slide and the mention to Slidesgo in the credits.
- Share this template in an editable format with people who are not part of your team.

## You are not allowed to:

- Sublicense, sell or rent this Slidesgo Template (or a modified version of this Slidesgo Template).
- Distribute this Slidesgo Template (or a modified version of this Slidesgo Template) or include it in a database or in any other product or service that offers downloadable images, icons or presentations that may be subject to distribution or resale.
- Use any of the elements that are part of this Slidesgo Template in an isolated and separated way from this Template.
- Register any of the elements that are part of this template as a trademark or logo, or register it as a work in an intellectual property registry or similar.

For more information about editing slides, please read our FAQs or visit our blog:

<https://slidesgo.com/faqs> and <https://slidesgo.com/slidesgo-school>

# Fonts & colors used

This presentation has been made using the following fonts:

**Outfit**

(<https://fonts.google.com/specimen/Outfit>)

**Lato**

(<https://fonts.google.com/specimen/Lato>)

#ffffff

#0c343d

#02c5ae

#7df3e5

#b6f8f0

# Storyset

Create your Story with our illustrated concepts. Choose the style you like the most, edit its colors, pick the background and layers you want to show and bring them to life with the animator panel! It will boost your presentation. Check out [how it works](#).



Pana



Amico



Bro



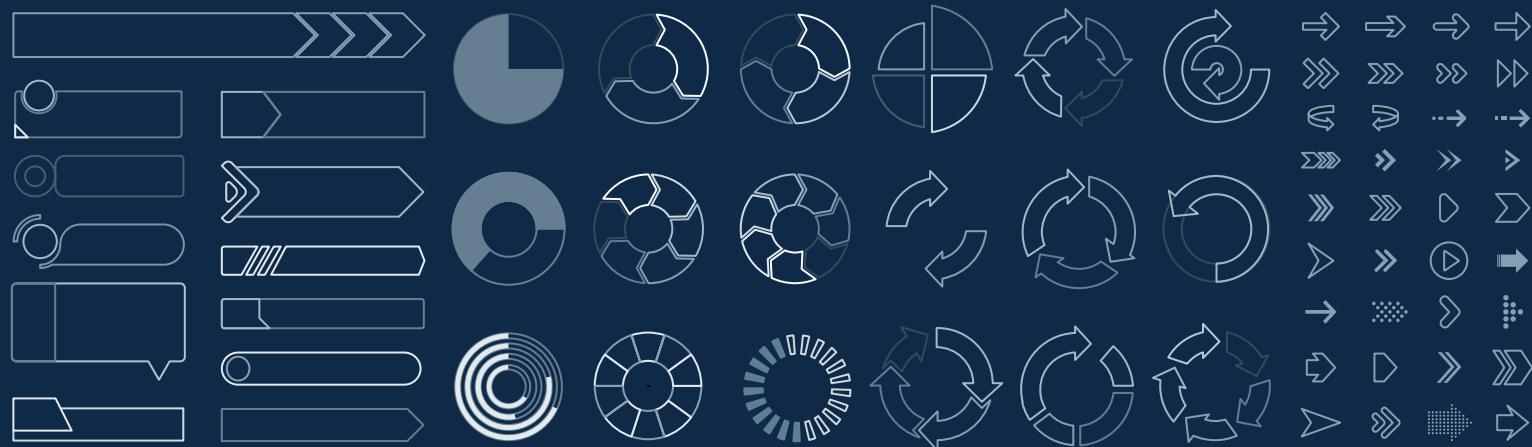
Rafiki



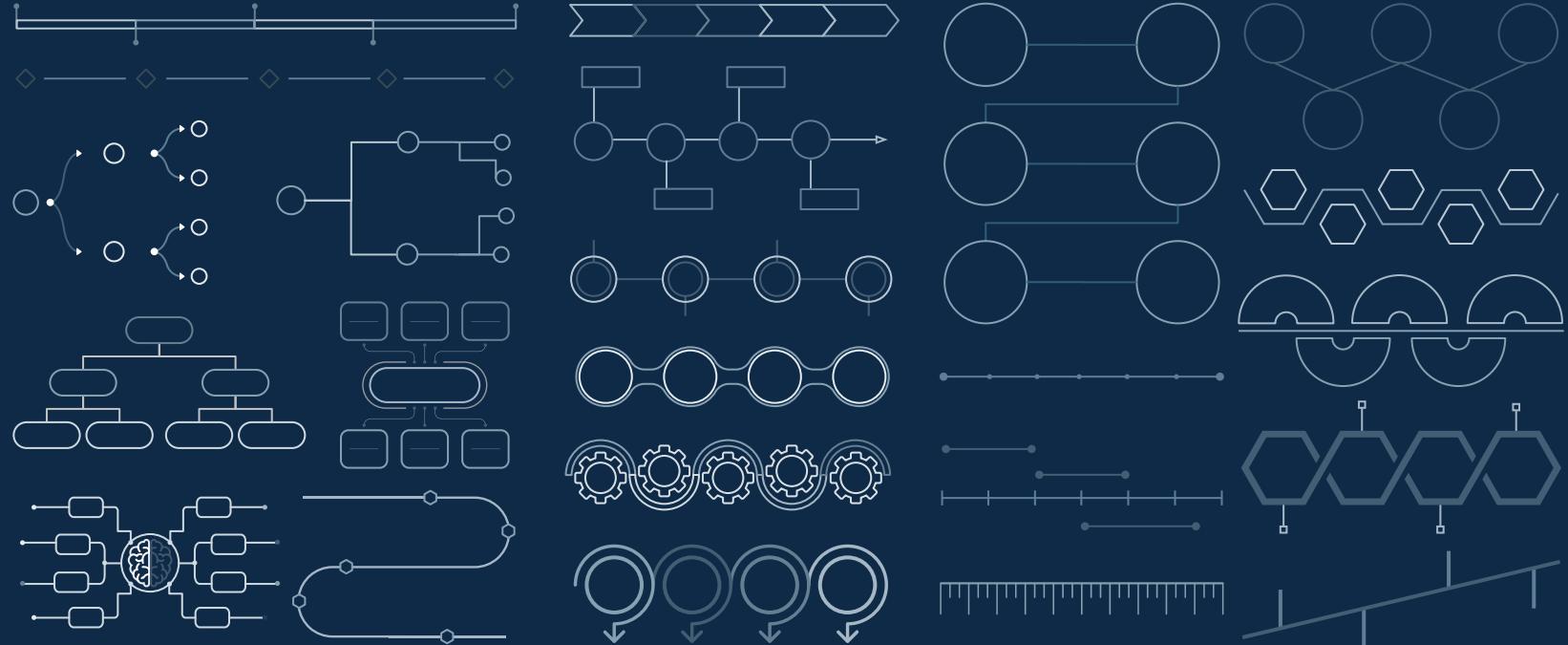
Cuate

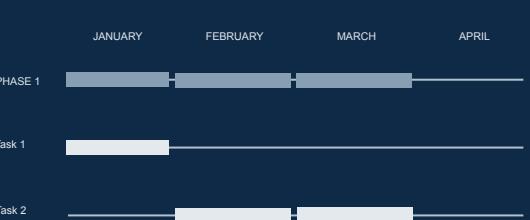
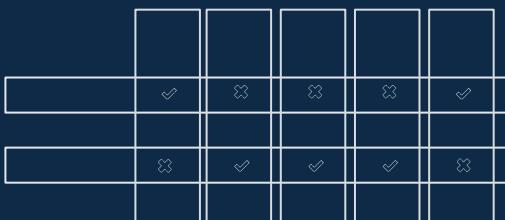
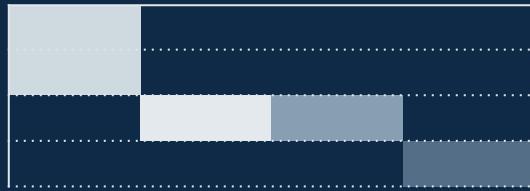
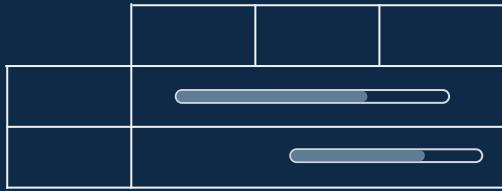
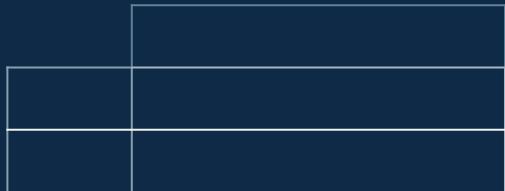
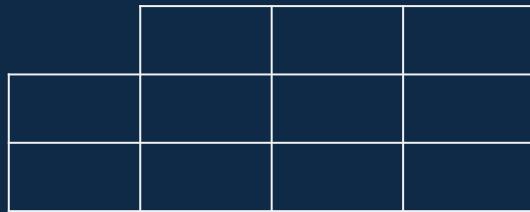
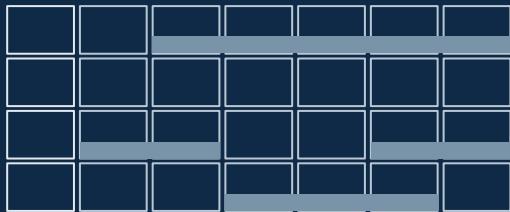
# Use our editable graphic resources...

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.

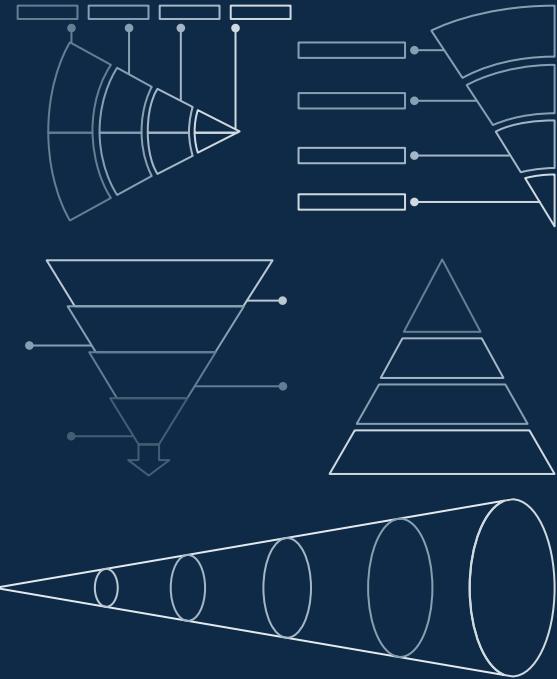
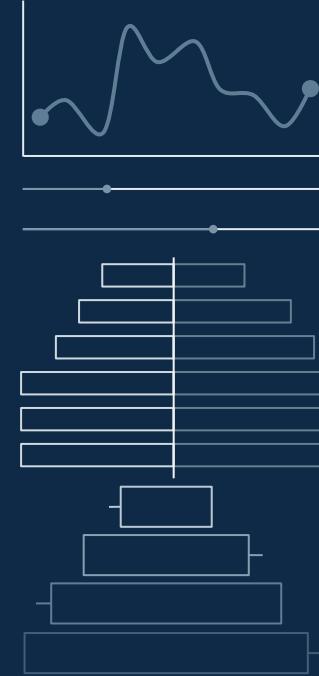
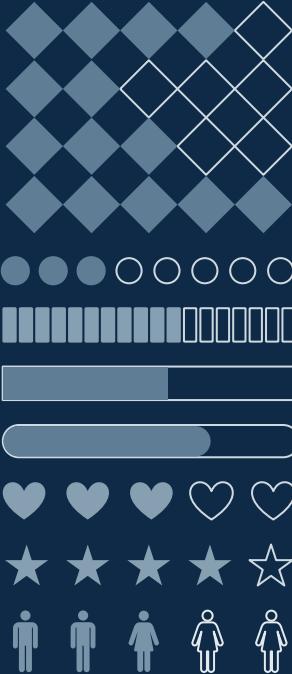
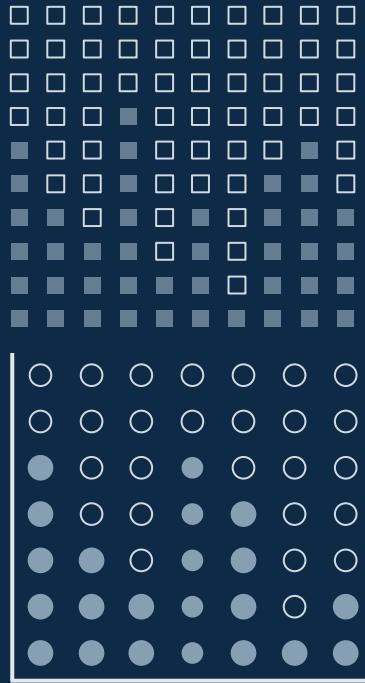












# ...and our sets of editable icons

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



