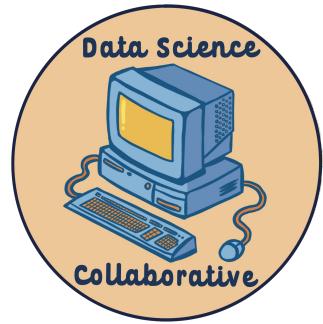


Workshop #2:

Intro to NumPy and Pandas

NumPy



Pandas



Quick Review - Lists and Dictionaries

List:

Collections of items
surrounded by brackets []

```
my_list = [1, "Hello", 2.125]
```

Dictionary:

Collections of items assigned
to labels, called “keys”

```
my_dict = {  
    'colors': ['red', 'blue', 'green'],  
    'numbers': [1, 2, 3],  
    'favorite food': 'pizza'  
}
```

Also recall: strings, integers and floats!

Quick Review - Indexing

Indexing means to retrieve an element from a collection (such as lists or dictionaries)

```
my_list = [1, "Hello", 2.125]
```

my_list[0] → 1

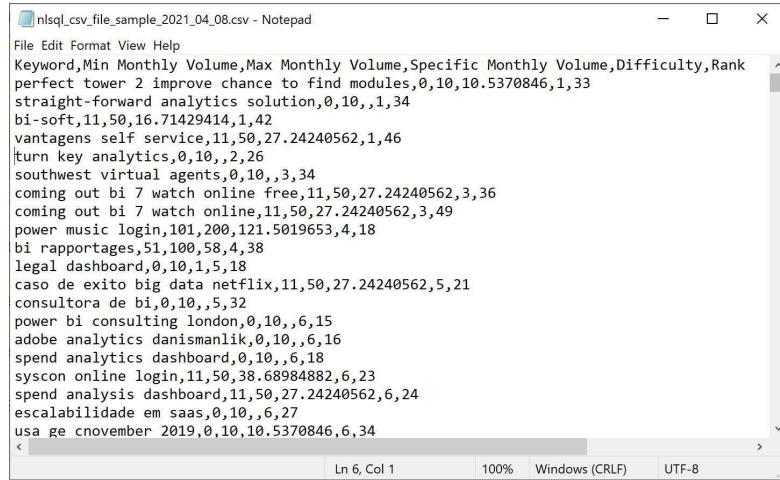
my_list[2] → 2.125

```
my_dict = {  
    'colors': ['red', 'blue', 'green'],  
    'numbers': [1, 2, 3],  
    'favorite food': 'pizza'  
}
```

my_dict['colors'] → ['red', 'blue', 'green']

my_dict['colors'][0] → 'red'

Quick Review - CSV's



```
nsql_csv_file_sample_2021_04_08.csv - Notepad
File Edit Format View Help
Keyword,Min Monthly Volume,Max Monthly Volume,Specific Monthly Volume,Difficulty,Rank
perfect tower 2 improve chance to find modules,0,10,10.5370846,1,33
straight-forward analytics solution,0,10,,1,34
bi-soft,11,50,16.71429414,1,42
vantagens self service,11,50,27,24240562,1,46
turn key analytics,0,10,,2,26
southwest virtual agents,0,10,,3,34
coming out bi 7 watch online free,11,50,27,24240562,3,36
coming out bi 7 watch online,11,50,27,24240562,3,49
power music login,101,200,121.5019653,4,18
bi rapportages,51,100,58,4,38
legal dashboard,0,10,1,5,18
caso de exito big data netflix,11,50,27,24240562,5,21
consultora de bi,0,10,,5,32
power bi consulting london,0,10,,6,15
adobe analytics danismanlik,0,10,,6,16
spend analytics dashboard,0,10,,6,18
syscon online login,11,50,38.68984882,6,23
spend analysis dashboard,11,50,27,24240562,6,24
escalabilidade em saas,0,10,,6,27
usa ge cnovember 2019,0,10,10.5370846,6,34
< Ln 6, Col 1 >
100% Windows (CRLF) UTF-8
```



Author	User Rating	Reviews	Price	Year	Genre
JJ Smith	4.7	17350	8	2016	Non Fiction
Stephen King	4.6	2052	22	2011	Fiction
Jordan B. Peterson	4.7	18979	15	2018	Non Fiction
George Orwell	4.7	21424	6	2017	Fiction
National Geographic Kids	4.8	7665	12	2019	Non Fiction
George R. R. Martin	4.4	12643	11	2011	Fiction
George R. R. Martin	4.7	19735	30	2014	Fiction
Amor Towles	4.7	19699	15	2017	Fiction
James Comey	4.7	5983	3	2018	Non Fiction
Fredrik Backman	4.6	23848	8	2016	Fiction
Fredrik Backman	4.6	23848	8	2017	Fiction
Larry Schweikart	4.6	460	2	2010	Non Fiction

Quick Review - CSV's

Author	User Rating	Reviews	Price	Year	Genre
JJ Smith	4.7	17350	8	2016	Non Fiction
Stephen King	4.6	2052	22	2011	Fiction
Jordan B. Peterson	4.7	18979	15	2018	Non Fiction
George Orwell	4.7	21424	6	2017	Fiction
National Geographic Kids	4.8	7665	12	2019	Non Fiction
George R. R. Martin	4.4	12643	11	2011	Fiction
George R. R. Martin	4.7	19735	30	2014	Fiction
Amor Towles	4.7	19699	15	2017	Fiction
James Comey	4.7	5983	3	2018	Non Fiction
Fredrik Backman	4.6	23848	8	2016	Fiction
Fredrik Backman	4.6	23848	8	2017	Fiction
Larry Schweikart	4.6	460	2	2010	Non Fiction

We usually have tidy data, this means:

- Each row is a new observation
- Each column is a feature/variable

• What Are Packages?



Base Python



NumPy



Pandas



What Are Packages?



```
np.array(my_list)
```

```
my_array1 + my_array2
```

```
my_array.sum()
```

```
data = pd.read_csv()  
data.head()
```

```
data["column_name"].mean()
```



```
data.info()
```

Important Structures

NumPy Array:

VERY similar to to a list

```
np.array([1, 2, 3, 4, 5])
```



```
array([1, 2, 3, 4, 5])
```

```
my_list = [1, 2, 3, 4, 5]  
np.array(my_list)
```



```
array([1, 2, 3, 4, 5])
```

```
np.array([[1,2,3],  
         [4,5,6],  
         [7,8,9]])
```



```
array([[1, 2, 3],  
       [4, 5, 6],  
       [7, 8, 9]])
```

Important Structures

```
np.array([[1,2,3],  
         [4,5,6],  
         [7,8,9]])
```



```
array([[1, 2, 3],  
       [4, 5, 6],  
       [7, 8, 9]])
```

1	2	3
4	5	6
7	8	9

Here, we have 3 rows and 3 columns

Thus, we call this a “3x3 array”

Indexing an Array

```
my_array = np.array([1,2,3,4,5])
```

Recall that indexing starts at 0!

my_array[0]



1

my_array[2]



3

How can we retrieve multiple elements?

my_array[0:3]



array([1, 2, 3])

Indexing an Array

```
my_array = np.array([1,2,3,4,5])
```

0 1 2 3 4

my_array[0:3]



array([1, 2, 3])

List slicing will **NOT** include the last specified element (here we excluded the four element, which was at index 3)

my_array[:3]



array([1, 2, 3])

my_array[3:]



array([4, 5])

Leaving the first slot blank means we will select from the start until the specified index. Leaving the second slot blank means we will select from the specified value until the end.

Important Structures

Pandas Data Frame:

Similar to a dictionary, but in a larger scale and much more organized

```
pd.DataFrame({  
    'colors': ['red', 'blue', 'green'],  
    'numbers': [1,2,3],  
    'favorite food': ['pizza', 'spaghetti', 'apples']  
})
```



	colors	numbers	favorite food
0	red	1	pizza
1	blue	2	spaghetti
2	green	3	apples

```
my_dict = {  
    'colors': ['red', 'blue', 'green'],  
    'numbers': [1,2,3],  
    'favorite food': ['pizza', 'spaghetti', 'apples']  
}  
  
pd.DataFrame(my_dict)
```



	colors	numbers	favorite food
0	red	1	pizza
1	blue	2	spaghetti
2	green	3	apples

Important Structures

Pandas Series:

(Usually) a single column of data

```
pd.Series([1,2,3,4,5])
```



	0
0	1
1	2
2	3
3	4
4	5

Indexing a Data Frame

	Movie	Rating	Genre
0	Cars 2	4.2	Family
1	The Exorcist	4.1	Horror
2	Click	4.7	Comedy

Indexing a Column:

```
movies ["Genre"]
```



	Genre
0	Family
1	Horror
2	Comedy

Indexing a Data Frame

	Movie	Rating	Genre
0	Cars 2	4.2	Family
1	The Exorcist	4.1	Horror
2	Click	4.7	Comedy

Indexing a Row:

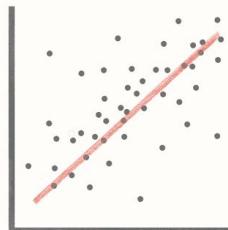
```
movies.iloc[0]
```



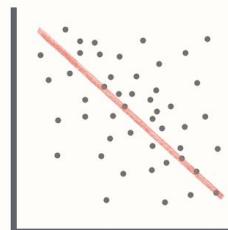
	0
Movie	Cars 2
Rating	4.2
Genre	Family

Correlation Coefficient

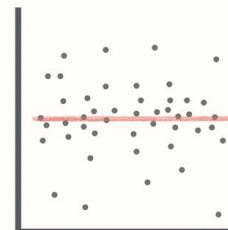
Correlation Coefficient



Positive Correlation



Negative Correlation



No Correlation

`.corr() = 1`

`.corr() = -1`

`.corr() = 1`

Negative correlation does not mean there less correlation! The close our value gets to 0, means there is less of a relationship between the two variables



A screenshot of a website for "DATA SCIENCE COLLABORATIVE". The header includes a navigation bar with links for Calendar, Projects, Meetings, Blog, and About. A search icon is also present. The main content features a blue desktop computer with a red arrow pointing upwards towards it. To the right, the text "DATA SCIENCE COLLABORATIVE" is displayed in large, bold, blue capital letters. Below this is an orange button with the text "Click Here to Join as a Member!". At the bottom, there is a paragraph of text about the organization's mission and goals.

At the Data Science Collaborative (DS Collab for short), our goal is to make data science accessible for everyone. We are dedicated to providing accessible resources and services through one-on-one mentorships, career check-ins, study halls, foundational project workshops, and most importantly, a community full of like-minded people. We promise a deliverable that will be presented at our year-end showcase featuring guest lecturers and industry employers. Join us today to develop your passion in the world of statistics!



Brief story

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

745,145

Big numbers catch your audience's attention

13,119

Big numbers catch your audience's attention



Milestones reached

Mars

Despite being red, Mars is a cold place, not hot



Mercury

Mercury is the closest planet to the Sun



Saturn

It's composed mostly of hydrogen and helium



Venus

It has a beautiful name, but it's terribly hot

Milestone reached



Saturn is the
ringed planet

Saturn

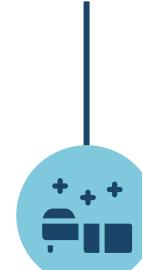
Mars

Mars is a cold
place, not hot



Earth

Earth is where
we all live



Venus has a
beautiful name

Venus



Our process

For the staff

- You can write your idea here

For the center

- You can write your idea here



Our process



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

- They're simple
- You can organize your ideas in a very clear way
- You'll never forget to buy milk!

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

Patient care

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

Patient care



Venus has a beautiful name and is the second planet from the Sun. It's hotter than Mercury, and its atmosphere is extremely poisonous

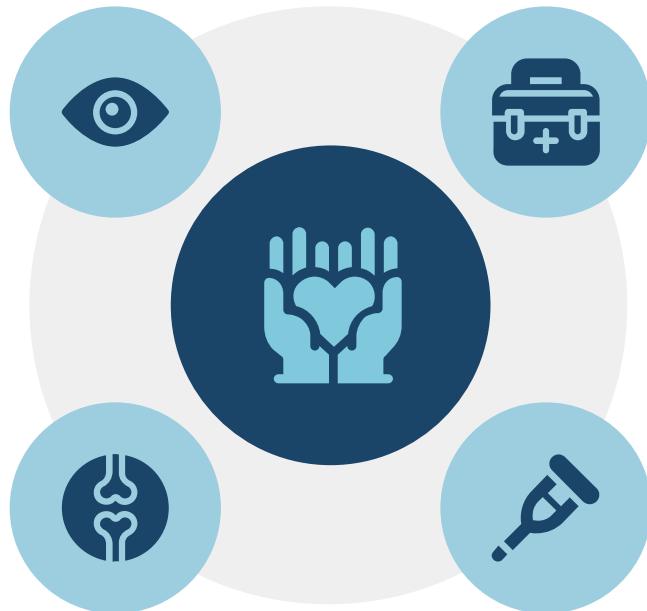
Our process

01 Venus

Venus has a beautiful name

02 Saturn

Saturn is a gas giant with rings



03 Mars

Mars is a cold place, not hot

04 Jupiter

Jupiter is the biggest planet

Our process

Jupiter
It's the biggest planet in
the Solar System

Saturn
Saturn is a gas giant and
has several rings



Venus

Venus is the second
planet from the Sun

Mars

Despite being red, Mars
is actually a cold place

Services



Mercury

Mercury is the smallest planet



Jupiter

It's the biggest planet of them all



Venus

Venus has a beautiful name



Saturn

Saturn is a gas giant with several rings



Mars

Despite being red, Mars is a cold place



Neptune

Neptune is far away from Earth

Services

Mercury

Mercury is the closest planet to the Sun

Saturn

Saturn is a gas giant and it has rings

Jupiter

It's the biggest planet in the Solar System

Mars

Despite being red, Mars is a cold place

Neptune

It's the farthest planet from the Sun

Areas we cover

30% **Mercury**

Mercury is the
smallest planet

10% **Jupiter**

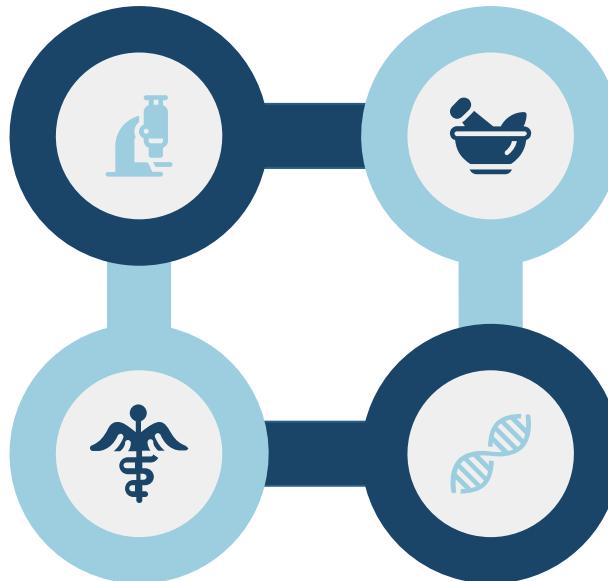
Jupiter is the
biggest planet

Mars **20%**

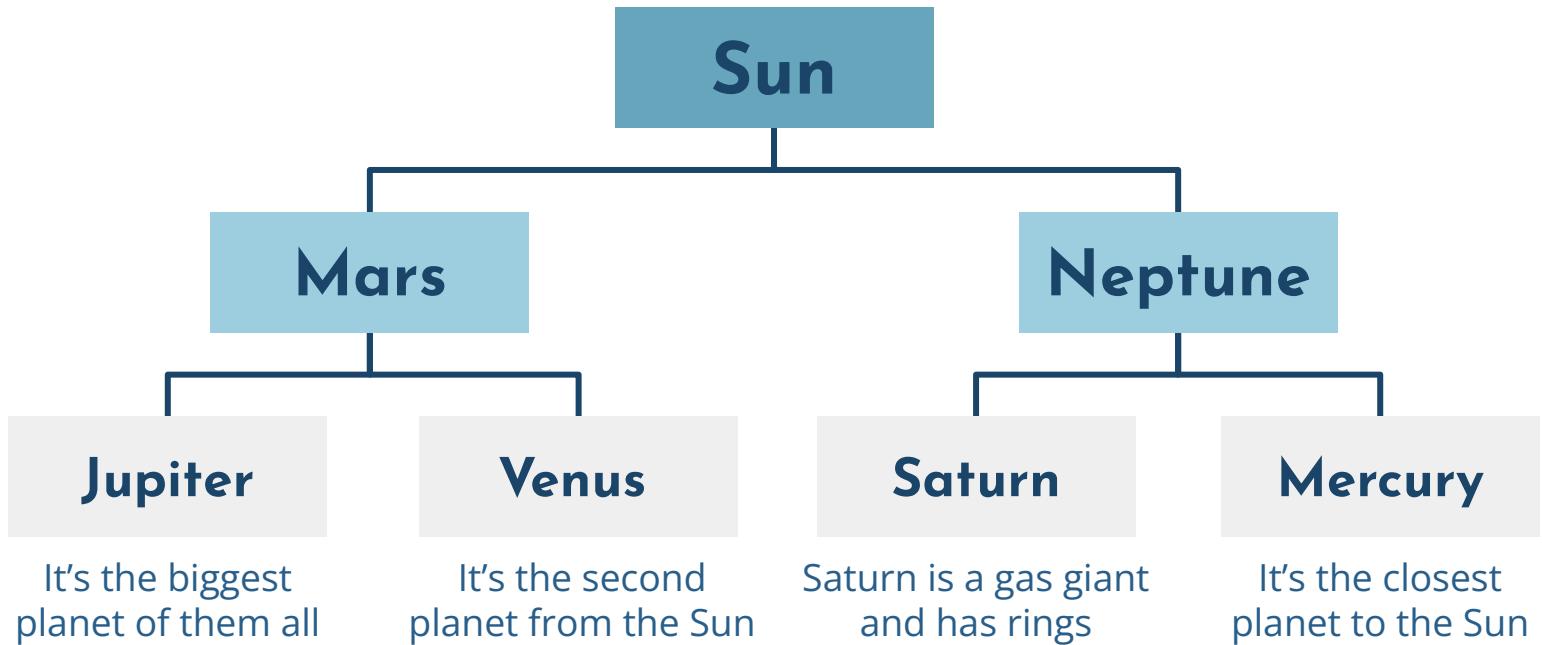
Despite being red,
Mars is cold

Neptune **40%**

Neptune is far
away from Earth

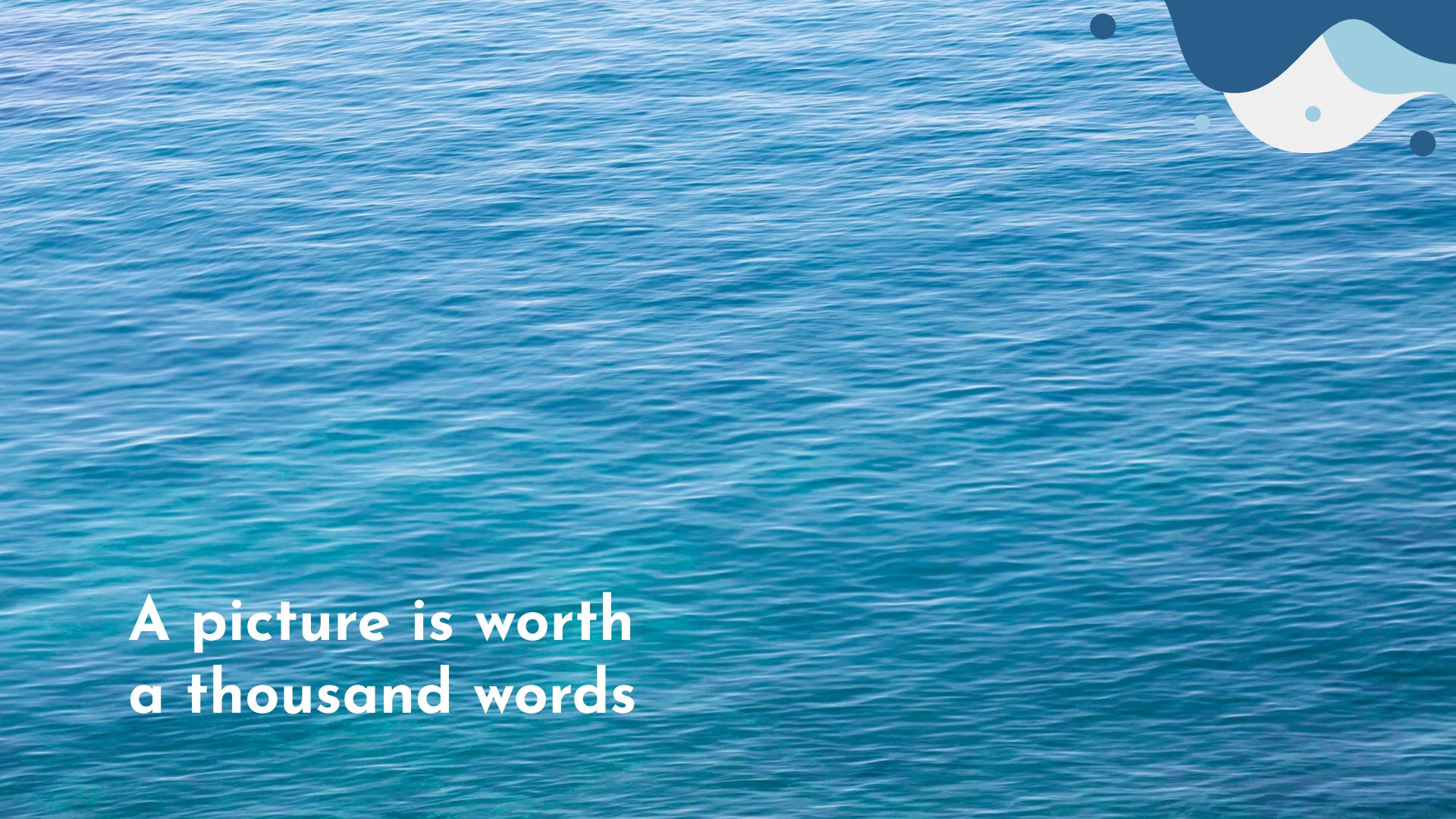


Areas we cover



A picture is worth
a thousand words



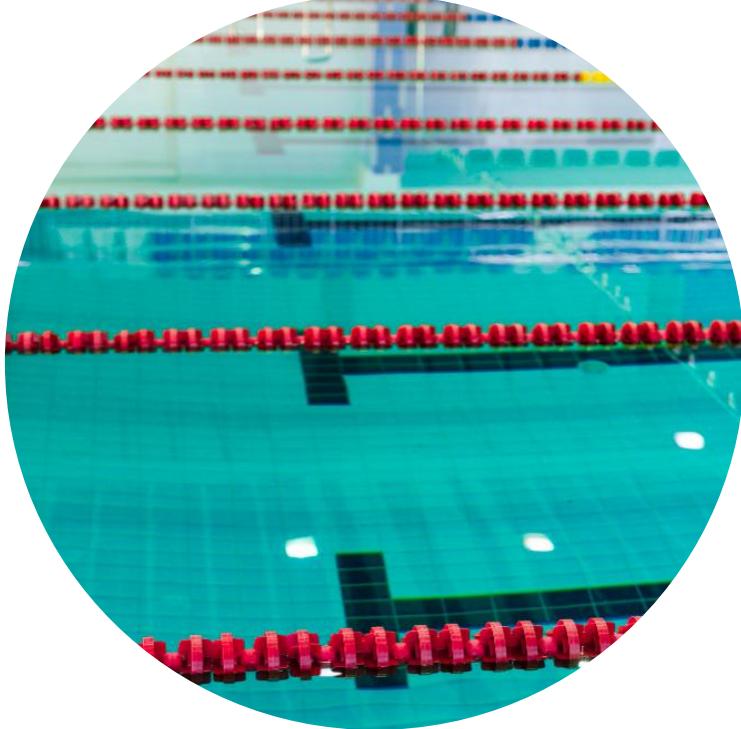


**A picture is worth
a thousand words**

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





A picture always reinforces the concept

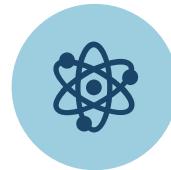
Images reveal large amounts of data, so remember: use an image instead of a long text. Your audience will appreciate it

Key accomplishments



Mercury

Mercury is the smallest planet



Venus

Venus has a beautiful name



Jupiter

It's the biggest planet of them all



Saturn

Saturn is a gas giant with rings

Key accomplishments

Mercury

Mercury is the closest planet to the Sun

Saturn

Saturn is a gas giant and has rings

Mars

Despite being red, Mars is a cold place

Jupiter

Jupiter is the biggest planet of them all

Neptune

It's the farthest planet from the Sun

Desktop mockup

You can replace the image on
the screen with your own work





Tablet mockup

You can replace the image on the screen with your own work

Phone mockup

You can replace the image on the screen with your own work



Patient satisfaction

Gender



Age



Results

Venus

Venus is the second planet from the Sun

01

Mars

Despite being red, Mars is a cold place, not hot

02

Mercury

Mercury is the closest planet to the Sun and the smallest one

03

Core customers

Gender



25%



75%

Age

18 - 35



80%

36 - 60



25%

Interest



Saturn is a gas giant and has rings



Mars is actually a cold place, not hot



Venus has a beautiful name

Testimonial

Jenna Doe, 25

"Mercury the closest planet to the Sun and it's only a bit larger than the Moon"

John James, 36

"Venus has a beautiful name, but it's hot, even hotter than Mercury"

Fred Blogs, 31

"Despite being red, Mars is a cold place, not hot. It's full of iron oxide dust"

Helena Smith, 58

"Saturn is a gas giant, composed mostly of hydrogen and helium"

Testimonials

Claire Blair

"Mercury is the smallest planet"

Bob Charlton

"Saturn is a gas giant and has rings"

John Stone

"Despite being red, Mars is a cold place"

Kate Poe

"Neptune is far away from Earth"

Mike Mills

"Jupiter is the biggest planet"

Lilly Roberts

"Venus is the second planet from the Sun"

Quality improvement measures

	Venus	Saturn	Jupiter	Mars
Measure 1	✓	✗	✓	✗
Measure 2	✗	✓	✗	✓
Measure 3	✓	✗	✓	✗
Measure 4	✗	✓	✗	✓

Schedule

A Gantt chart illustrating task timelines over two weeks. The vertical axis lists four tasks: Task 1, Task 2, Task 3, and Task 4. The horizontal axis shows days of the week: Mon, Tue, Wed, Thu, Fri for Week 1, and Mon, Tue, Wed, Thu, Fri for Week 2. Each task is represented by a dark blue horizontal bar indicating its duration.

Task	Week 1					Week 2				
	Mon	Tue	Wed	Thu	Fri	Mon	Tue	Wed	Thu	Fri
Task 1										
Task 2										
Task 3										
Task 4										



Awesome words

Awesome words



Innovations



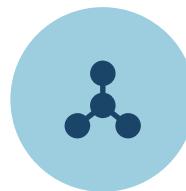
Mercury

Mercury is the closest planet to the Sun



Venus

Venus has a beautiful name, but it's very hot



Mars

Despite being red, Mars is a cold place

Innovations



Mercury

Mercury is the closest planet to the Sun



Saturn

Saturn is a gas giant and has rings



Mars

Despite being red, Mars is a cold place

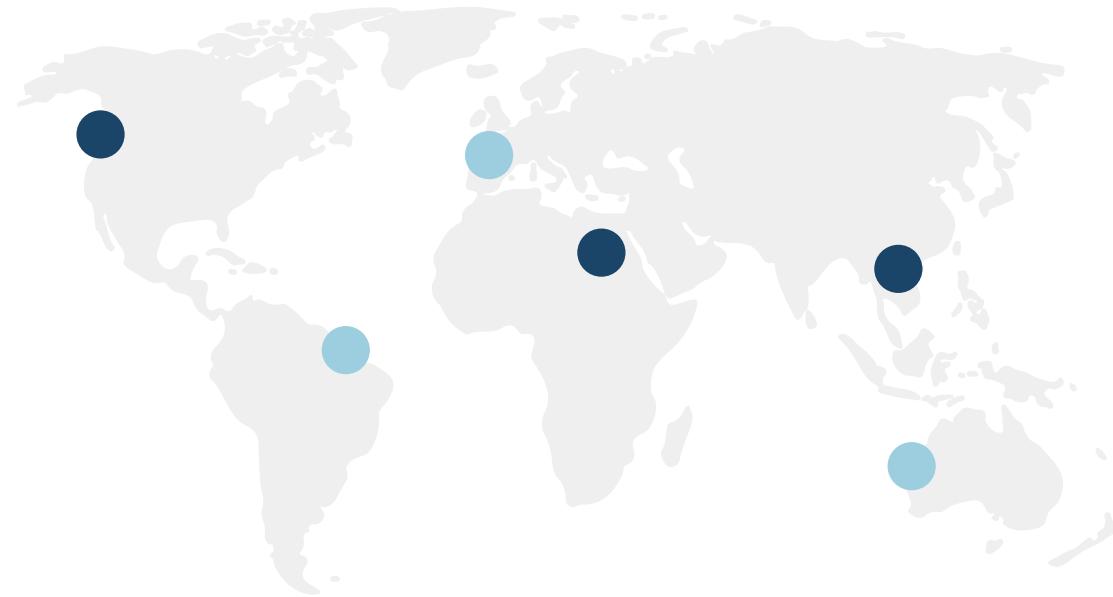
Location center

Mars

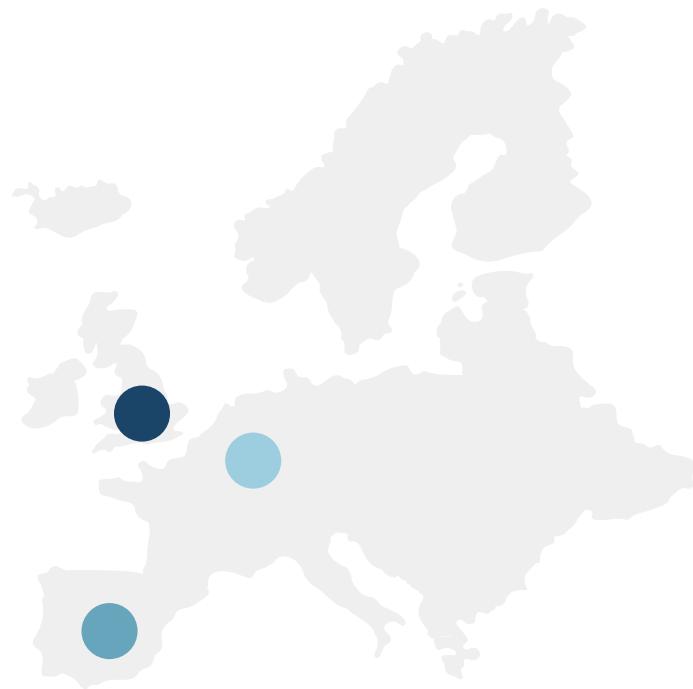
Despite being red,
Mars is a cold
place, not hot

Venus

Venus has a
beautiful name, but
it's terribly hot



Location center



Mars

Mars is a cold place, not hot



Jupiter

It's the biggest planet of them all



Saturn

Saturn has several rings

Awards

2011-2012



Mars

Mars is a cold place,
not hot

2015-2016



Saturn

Saturn is composed
mostly of hydrogen

2018-2019



Venus

Venus has a
beautiful name

Awards

Project	Award	Year
Mercury	Name of the award	2016
Mars	Name of the award	2018
Jupiter	Name of the award	2020
Venus	Name of the award	2021

Our team



Jenna Doe

You can talk a bit about
this person here



John James

You can talk a bit about this
person here

Our team

James Rice

You can talk a bit about
this person here



Anna Grey

You can talk a bit about
this person here



Lena Jordan

You can talk a bit about
this person here



Peter Miles

You can talk a bit about
this person here



Thanks

Do you have any questions?

your email@freepik.com

+91 620 421 838

yourcompany.com



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

Please keep this slide for attribution

Icon pack



Alternative resources



Alternative resources



Alternative infographic resources



Alternative resources

Photos

- High angle of male swimmer in the water pool
- Smiley male swimmer posing with goggles and cap in the pool
- High angle of male swimmer swimming in water pool
- Front view young man at basin stretching
- High angle male stretching before swimming

Alternative resources

Photos

- Full shot athlete in pool
- Athlete underwater full shot
- Front view of beautiful dreamer
- Mid shot man splashing out of water
- Full shot swimmer in pool
- Full shot athlete swimming underwater

Vectors

- Abstract waves banner



Resources

Photos

- Male swimmer floating in the pool
- Male swimmers swimming in the pool
- Woman at latino hair salon
- Close up smiley man in therapy
- Woman swimmer swimming close up
- Side view smiley girl in pool
- Photo of modern indoor swimming pool

Vectors

- Abstract rounded shape business card template
- Dynamic poster collection

Resources

Photos

- Medium shot woman with swimming equipment
- Top view modern swimming pool
- Top view clear ocean water texture
- Portrait of handsome man outdoors
- Smiley man posing medium shot
- Mid shot woman therapist with clipboard inviting patient in cabinet
- Medium shot woman in studio
- Clear ocean water texture
- Woman doing front crawl swimming in pool
- Photo of swimming pool with delimitation cordons

Vectors

- Geometric background
- Abstract colorful background
- Map of europe with colors in flat style
- Gradient steps infographic
- Timeline infographic design

Icon

- Spa



Instructions for use (premium users)

In order to use this template, you must be a Premium user on [Slidesgo](#).

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 Slidesgo School:

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

Fonts & colors used

This presentation has been made using the following fonts:

Josefin Sans

(<https://fonts.google.com/specimen/Josefin+Sans>)

Open Sans

(<https://fonts.google.com/specimen/Open+Sans>)

#1a4568

#285e89

#9dcdef

#66a5bb

#80c9dd

#efefef

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



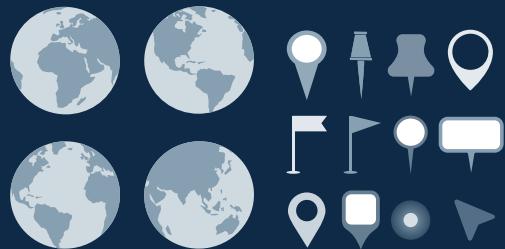
Cuate

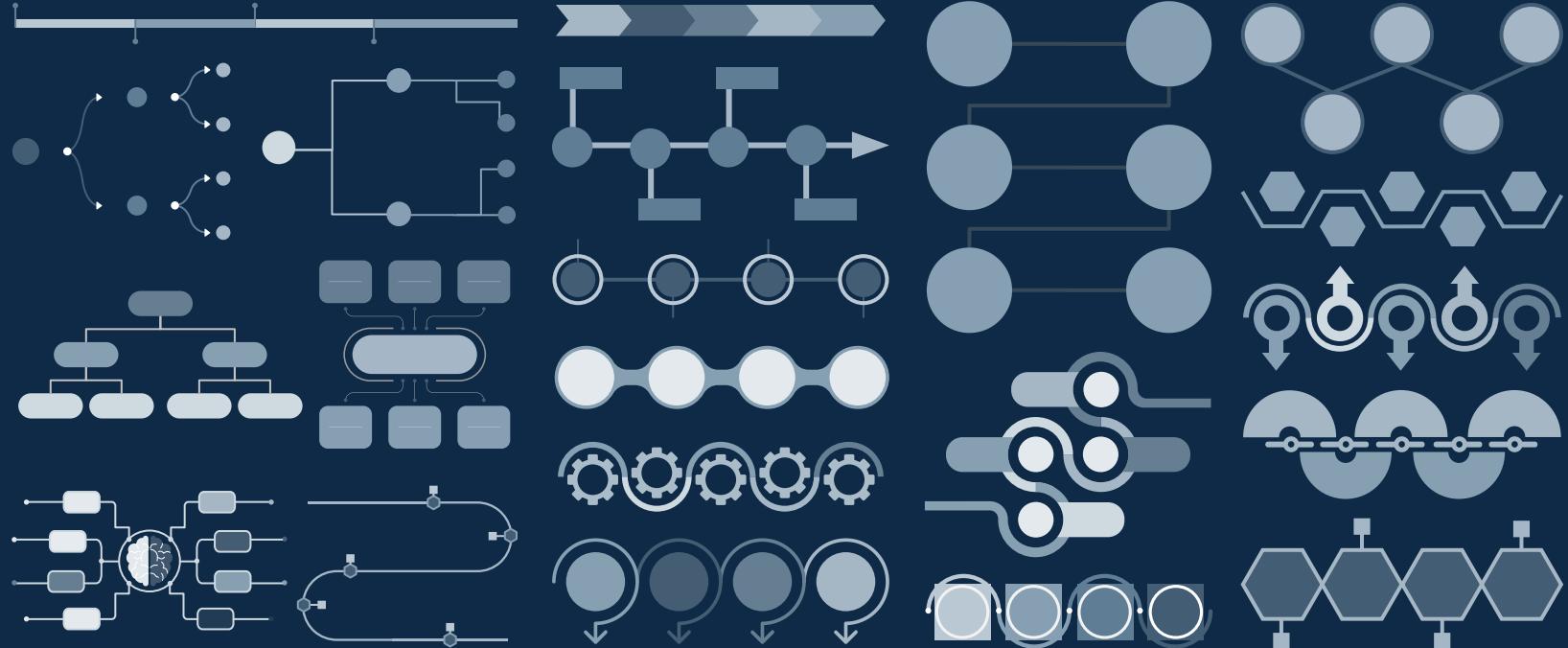
Use our editable graphic resources...

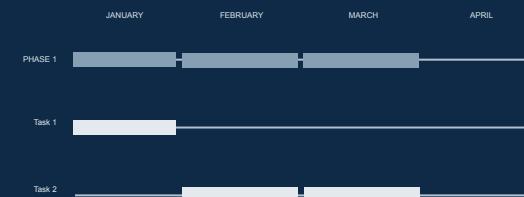
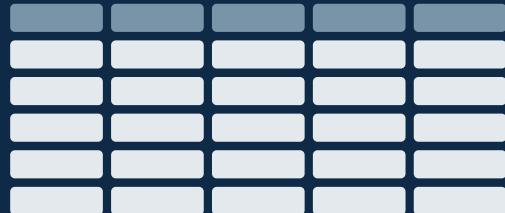
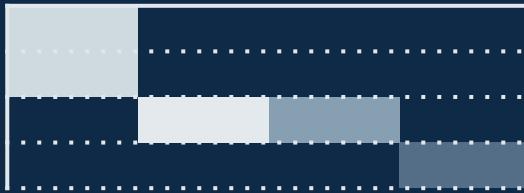
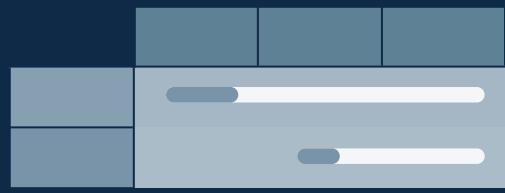
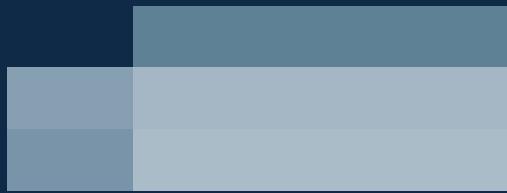
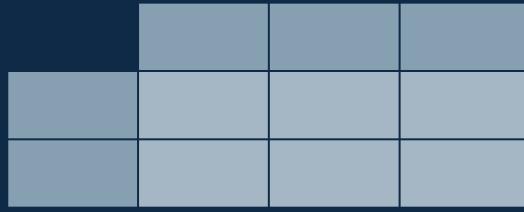
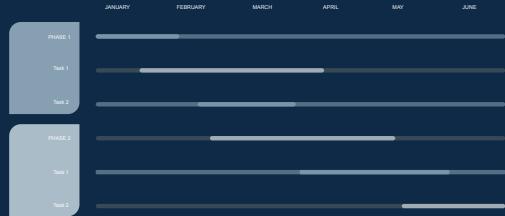
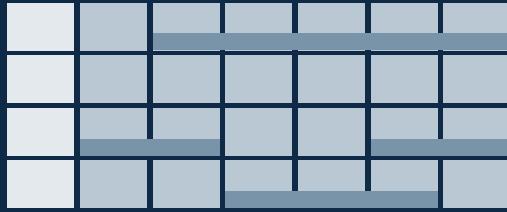
You can easily resize these resources without losing quality. To change the color, just ungroup the resource and click on the object you want to change. Then, click on the paint bucket and select the color you want.

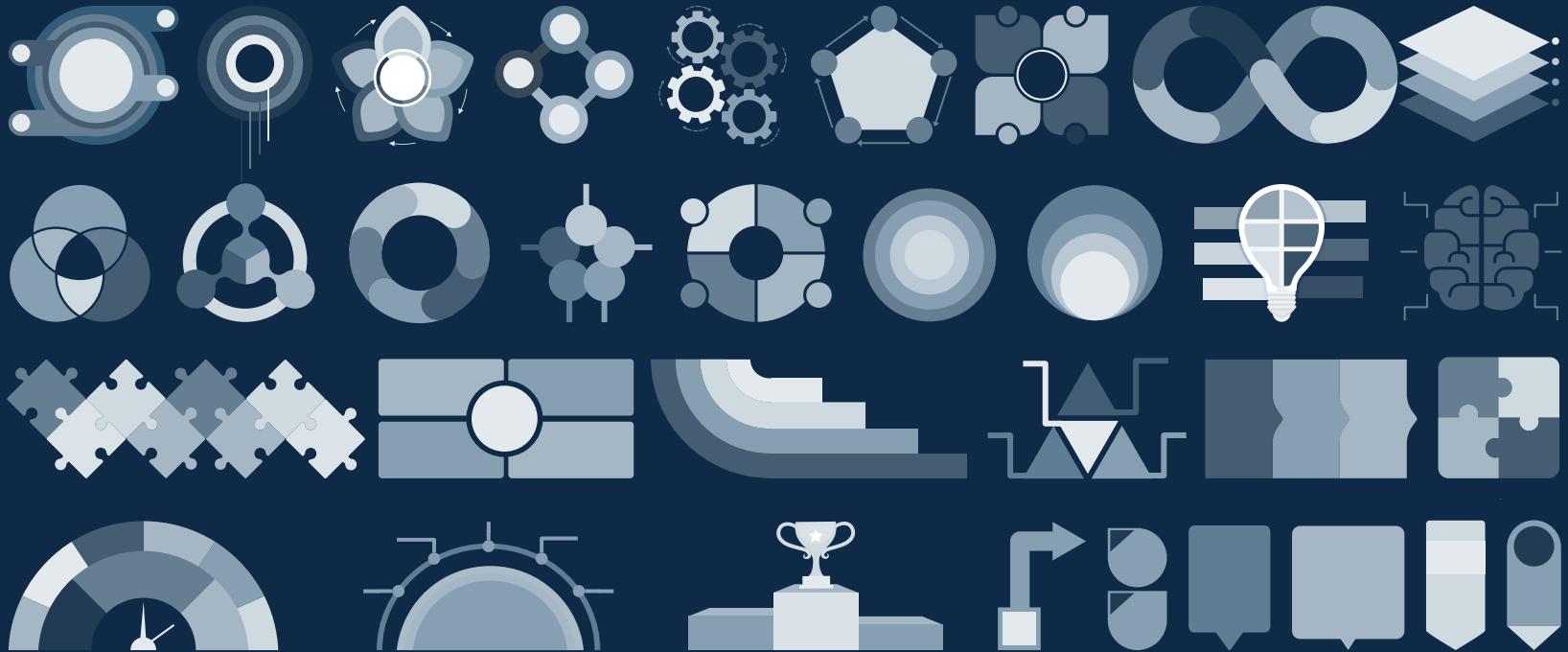
Group the resource again when you're done. You can also look for more infographics on Slidesgo.

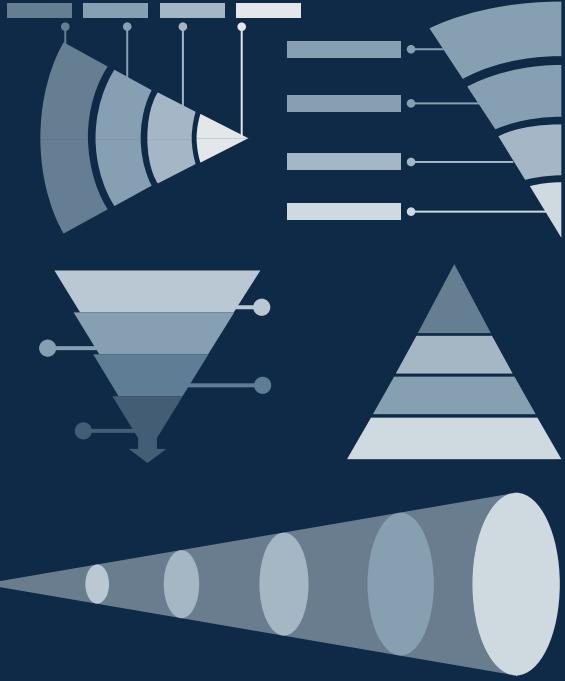
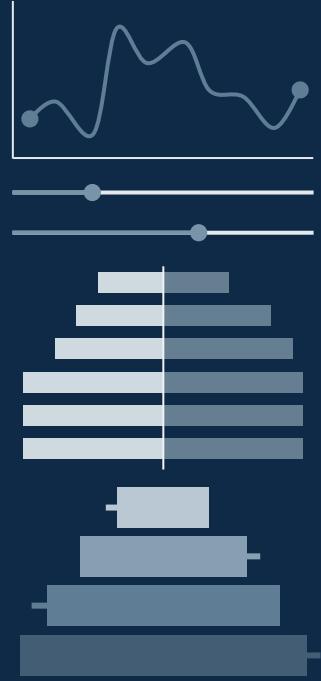
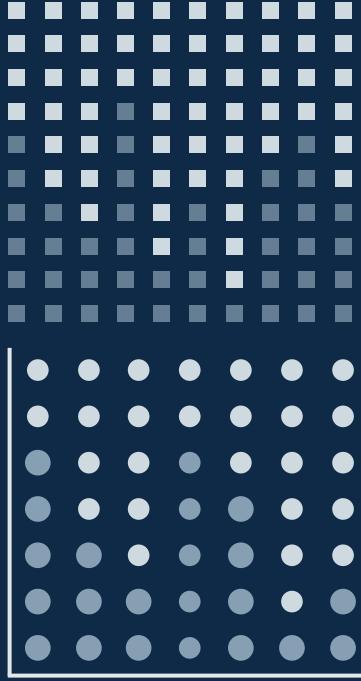












...and our sets of editable icons

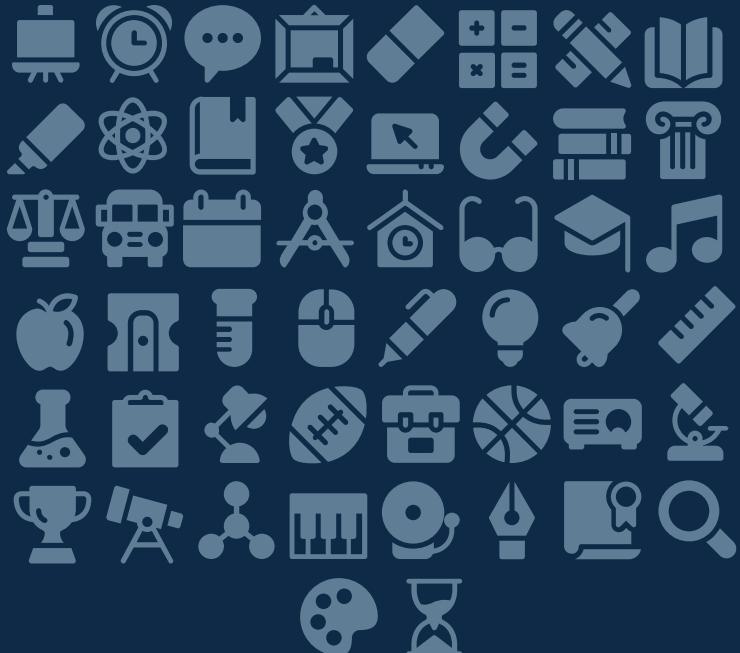
You can resize these icons without losing quality.

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



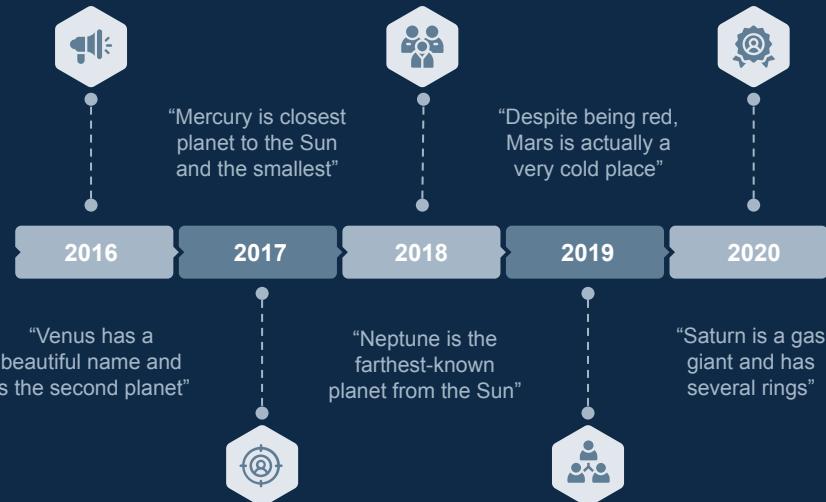
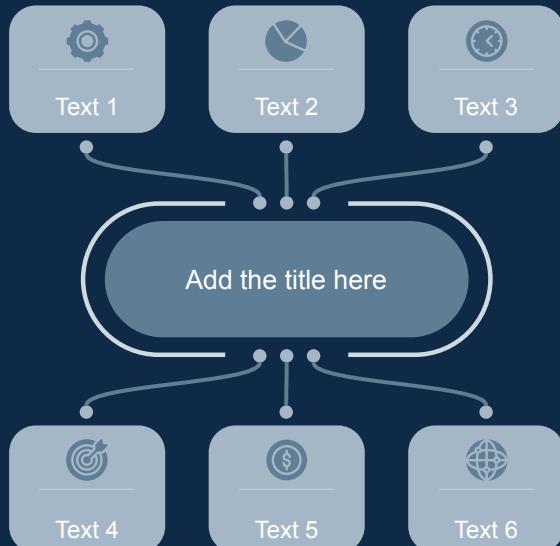
Nature Icons



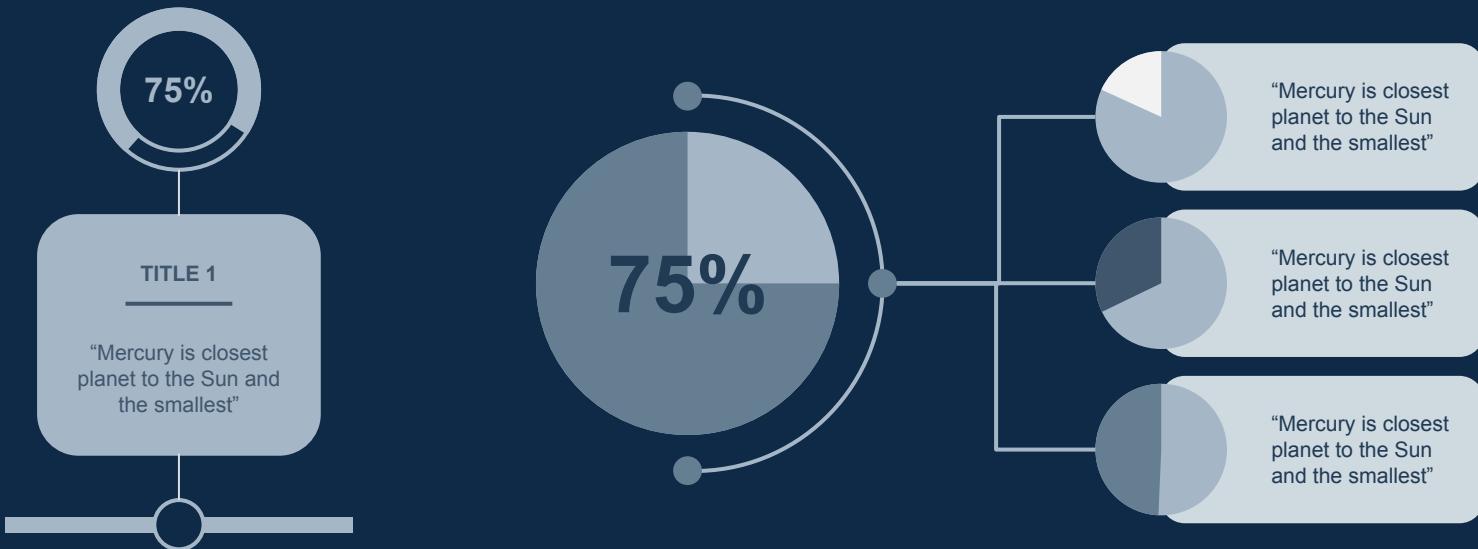
SEO & Marketing Icons



Premium infographics

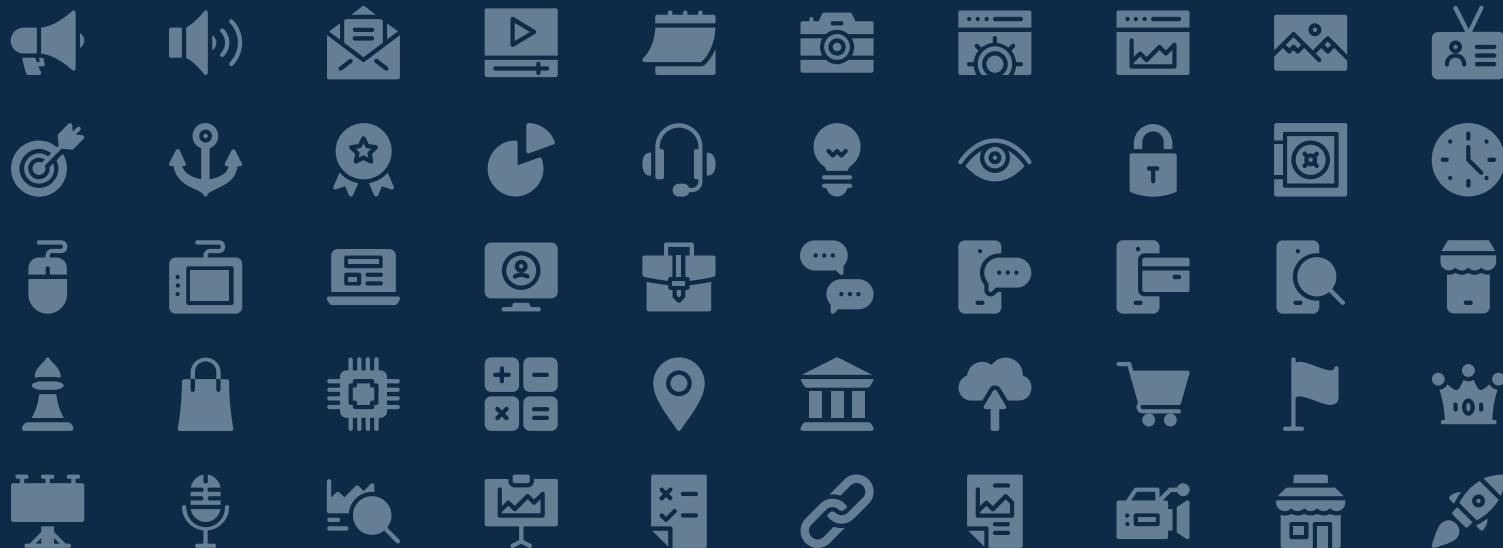


Premium infographics



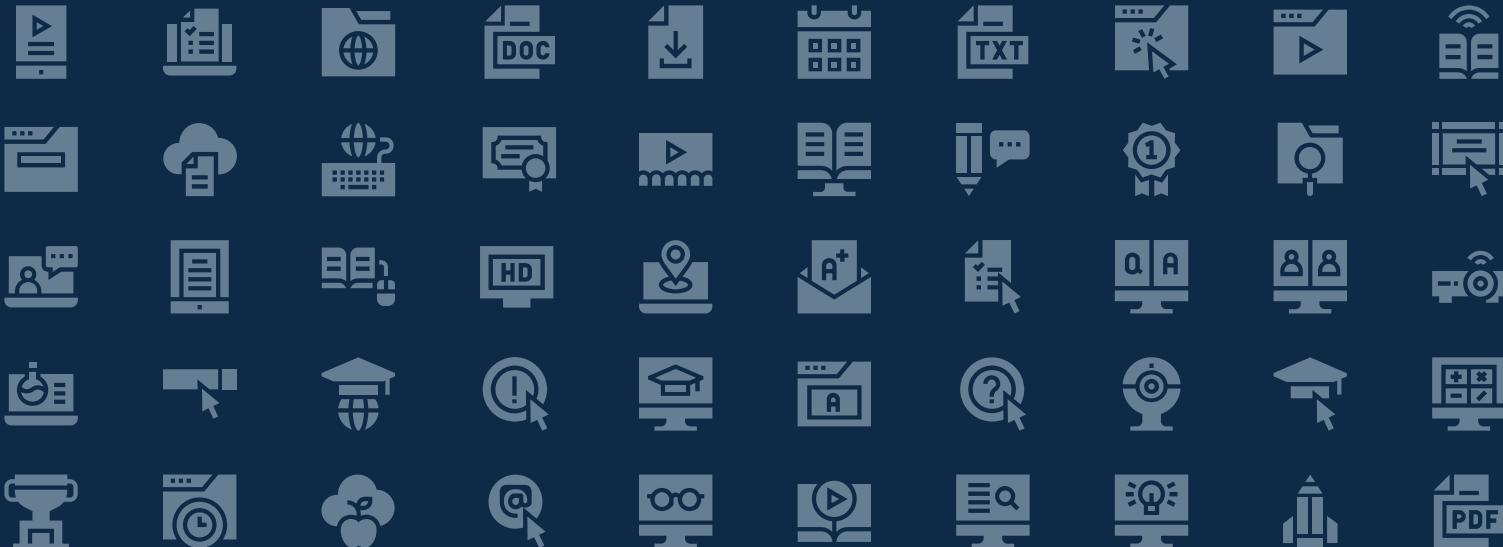
Premium Icons

Digital Marketing



Premium Icons

Online Learning



Premium Icons

Laboratory



Premium Icons

Goals & Results



Premium Icons

Infographic Elements



