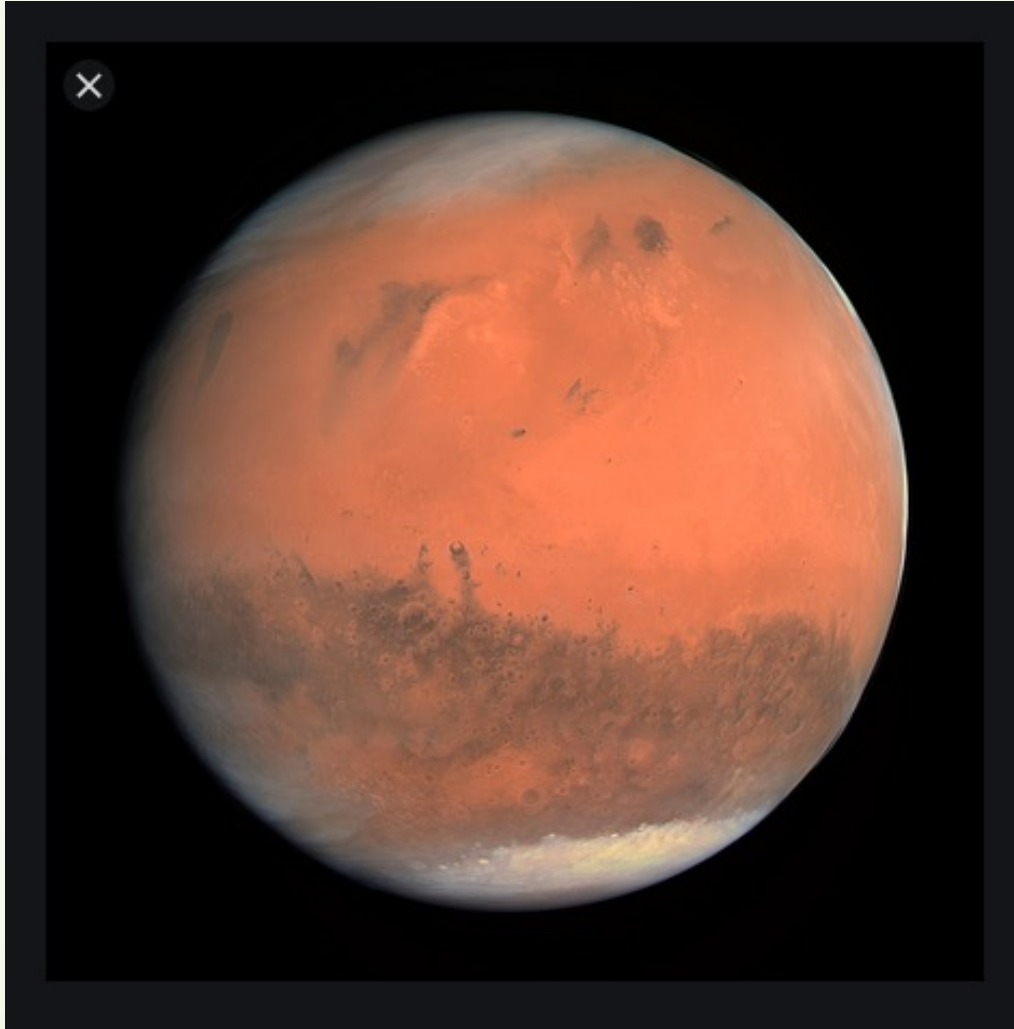




**ACTIVITIES UNLIMITED  
SCIENCE CLUB  
JUNE 15, 2021**

**Mission to Mars**

**Presented By  
Marty Velario**



## Why

- Explore Mars
- What do we hope to find on Mars
- Humans on Mars

# Mars

- ▶ Fourth planet from the Sun
  - ▶ Second smallest planet in our Solar System
    - ▶ Mercury is the smallest
- ▶ Has two Moons
  - ▶ Phobos
  - ▶ Deimos

## Interesting Facts

- ▶ Since October, 1960
  - ▶ Forty-nine launches to Mars
  - ▶ First five by the Soviet Union
    - ▶ All failures
- ▶ First twenty-nine missions to Mars
  - ▶ October, 1960 to December, 1996
    - ▶ Soviet Union – 17
    - ▶ United States – 11
    - ▶ Russia – 1

## Interesting Facts

- ▶ All 49 missions thru 2020 launchings
  - ▶ United States – 23
  - ▶ Soviet Union 17
  - ▶ Russia, China, EU – 2 each
  - ▶ Japan, India, United Arab Emirates – 1 each

## Interesting Facts

- Missions by decade
  - 49 total

1960s	12
1970s	11
1980s	2
1990s	7
2000s	8
2010s	6
2020+	3

## Interesting Facts

- ▶ First successful flyby occurred on July 15, 1965
  - ▶ Mariner 4 launched by NASA on November 28, 1964
- ▶ The first lander on Mars
  - ▶ By the Soviet Union on December 2, 1971
  - ▶ Contact lost 104.5 seconds after landing
- ▶ NASA's Viking 1 Orbiter
  - ▶ Entered Mars orbit on January 19, 1976
  - ▶ Operated for 1,385 orbits around Mars



## Missions to Mars

- In 2020 three missions launched to Mars
  - Hope – United Arab Emirates Orbiter
    - July 19, 2020
  - Tianwen-1 – China
    - Launch July 23, 2020
  - Mars 2020 – USA
    - Launched July 30, 2020
- Future missions
  - European Space Agency and Russian Roscosmos State Corporation
    - Launch date September 20, 2022

## Mars Rovers

- ▶ The USA has accomplished
  - ▶ Eight landers and rovers on Mars' surface
- ▶ Successful landings on Mars in 2021
  - ▶ Perseverance– USA
    - ▶ Landed February 18, 2021
  - ▶ Zhurong – China
    - ▶ Landed May 14, 2021

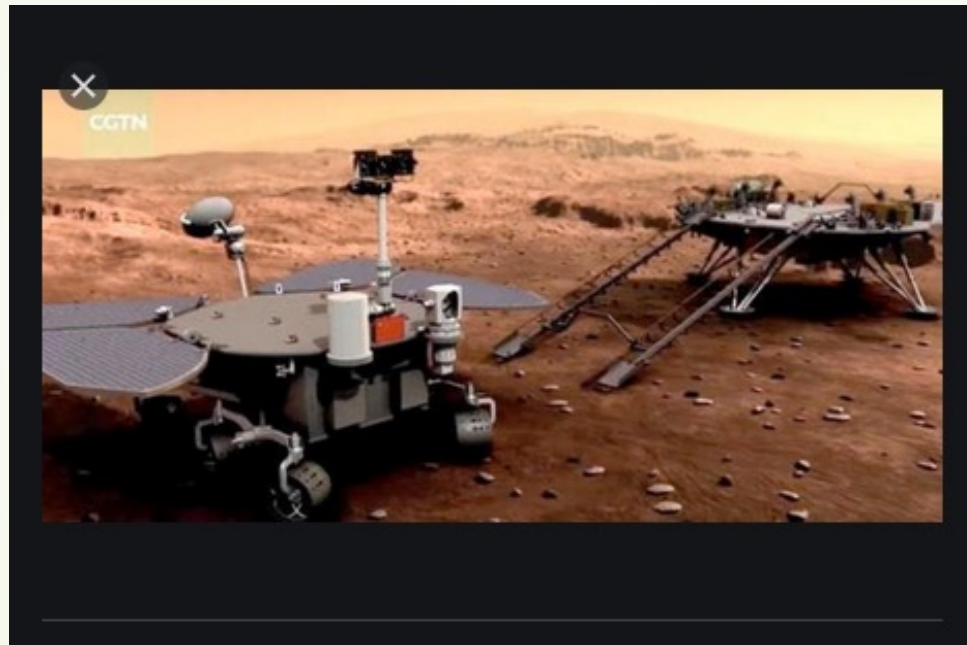
# Mars Rovers

- ▶ The two rovers exploring Mars in 2021
  - ▶ Will carry some similar instruments and some unique ones
- ▶ European Space Agency rover is scheduled to explore Mars in 2023
- ▶ The next three slides will describe the differences

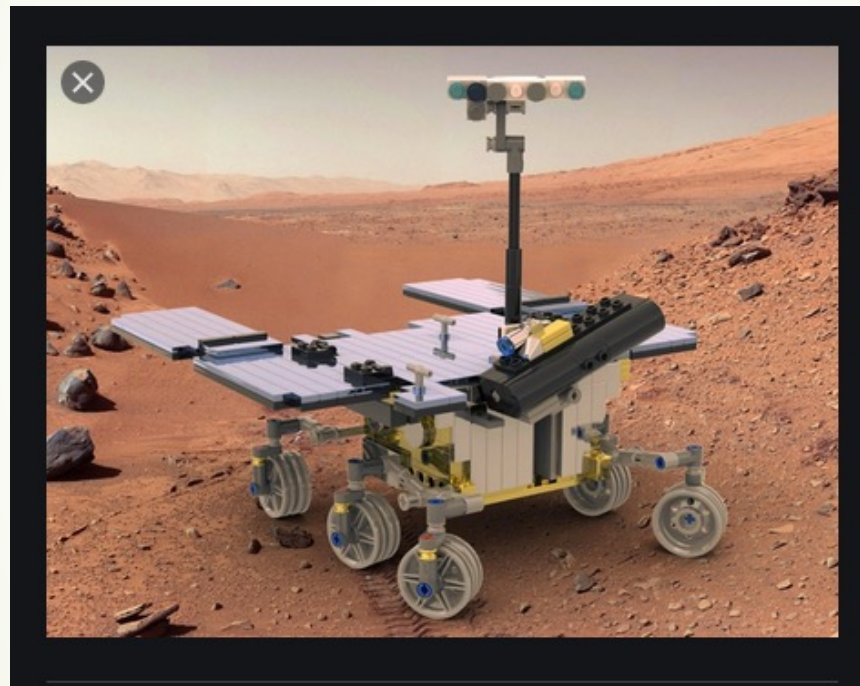
# Mars Rovers - Perseverance



## Mars Rovers - Zhurong



## Mars Rovers – Rosalind Franklin



## Mission to Mars

- ▶ Jet Propulsion Lab (JPL) animation of a concept for a rover landing
  - ▶ 5 minute video

## Mission to Mars



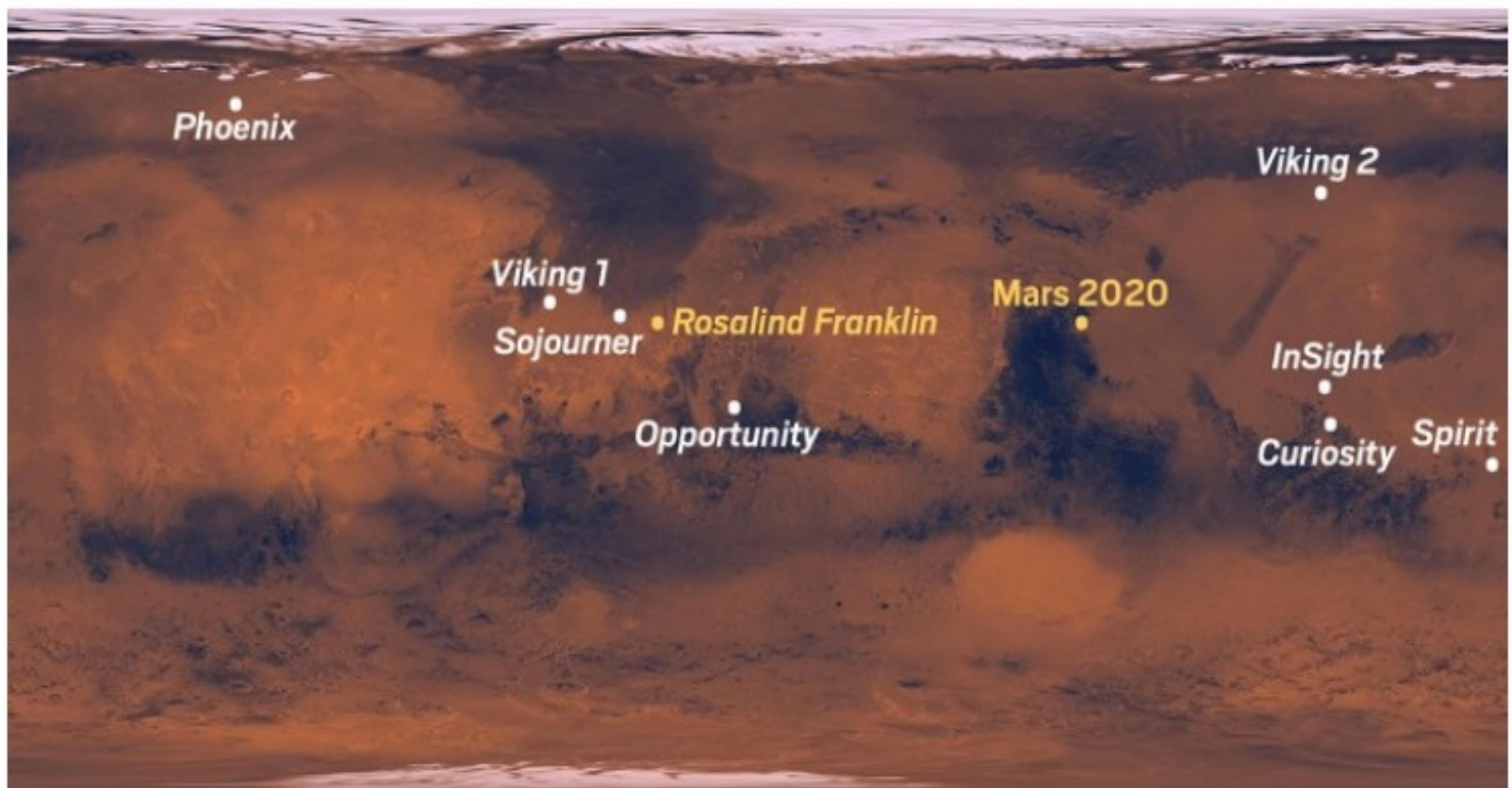


# Ingenuity



## Rover Landings

- ▶ Map of where rover landings occurred
  - ▶ Perseverance
    - ▶ Landed in Jezero Crater just north of the Martian equator
  - ▶ China's Zhurong Rover landed in Utopia Planitia
    - ▶ Mars' northern hemisphere
    - ▶ Near to Perseverance's landing site
  - ▶ Rosalind Franklin
    - ▶ Expected to landed in Oxia Planum east Jezero Crater



Credit: USGS Astrogeology Science Center

The landers and rovers that have successfully touched down on Mars have done so in regions scattered across the planet's surface.

## Future Mars Explorations

- ▶ Mars Orbiter Mission 2 by India
  - ▶ Planned launch in 2024
- ▶ NASA
  - ▶ Presidential orders to land humans on Mars by 2033
- ▶ European Space Agency
  - ▶ Long term goal to send humans to Mars
  - ▶ Spacecraft has not yet been built

## Private Companies

- ▶ SpaceX – Elon Musk
  - ▶ First launch June 4, 2010
  - ▶ Most recent launch occurred on June 6, 2021
- ▶ Blue Origins – Jeff Bezos
  - ▶ First human flight scheduled for July 20, 2021
  - ▶ Third seat offered in months long auction
    - ▶ Auction closed on June 12, 2021
    - ▶ High bid was \$28,000,000

## Videos

- ▶ Mars 2020 Mission
  - ▶ Launched July 30, 2020
  - ▶ 7 minute video

<https://www.youtube.com/watch?v=K-UKgePczbY>

## Videos

- ▶ Perseverance landing
  - ▶ February 18, 2021
  - ▶ 3 minute video

<https://www.youtube.com/watch?v=rzmd7RouGrM>

## Videos

- ▶ Ingenuity
  - ▶ Audio transmission during the fourth flight
  - ▶ 3 minute video

<https://www.youtube.com/watch?v=y5niGi4k9vQ>



## Videos

- ▶ Perseverance Rover
  - ▶ What's different this time
  - ▶ 17 minute video

<https://www.youtube.com/watch?v=95hMM2u6Fgw>

➤ THANK YOU

A man with a beard and a top hat, wearing a dark poncho, stands in a desert landscape with mountains in the background. The scene is overlaid with a semi-transparent purple rectangle containing text and a radio icon.

 **The Good  
the Bad  
and the Ugly**  
Ennio Morricone