



# Launch Day

Play-by-play of the SpaceX Demo-2 Flight

#LAUNCHAMERICA



# What is going on today?



Astronauts are launching to the International Space Station from **American soil** for the first time since 2011.

Come along for the journey starting at Launch-minus (L-minus) 5 hours...

# Who are you on this journey with?



**Bob Behnken**

**Hometown:** St. Ann, MO

**Studied:** Physics, Mechanical Engineering

**Flight experience:** Air Force Colonel and flight test engineer

**Spaceflight experience:** Flew on the space shuttle Endeavour twice



**Doug Hurley**

**Hometown:** Apalachin, NY

**Studied:** Civil Engineering

**Flight experience:** Marine Corps Colonel, test pilot and fighter pilot

**Spaceflight experience:** Piloted the space shuttle Endeavour and Atlantis on the final shuttle flight



# Writing & Sharing Activity



Imagine you are preparing to launch to the International Space Station for several months, where you may not have access to some of your favorite things.

What would you want to do the day before your launch? Describe where you might visit, or what you might do or eat the day before the launch.

# Getting Ready

**L-minus 5 hours:** It's breakfast time for the big day! The crew enjoys a delicious meal before preparing for launch.

**L-minus 4 hours 30 minutes:** A weather update will help to determine the possibility of launching.

**L-minus 4 hours:** The astronauts will suit up in their flight gear before heading to the launch pad.



# Leaving Crew Quarters

## **L-minus 3 hours 10 minutes:**

The crew is transported to the launch pad.

## **L-minus 2 hours 50 minutes:**

The astronauts arrive at the launch pad and travel up the launch tower to the crew access arm, where they will board the spacecraft.



# Climbing Aboard the Dragon

**L-minus 2 hours 15 minutes:** The crew ingresses, or enters, the Crew Dragon spacecraft.

**L-minus 1 hour 50 minutes:** After both astronauts are safely secured in their seats with the help of their closeout team, the closeout team closes and secures the hatch door.





## The vehicle is ready to go!

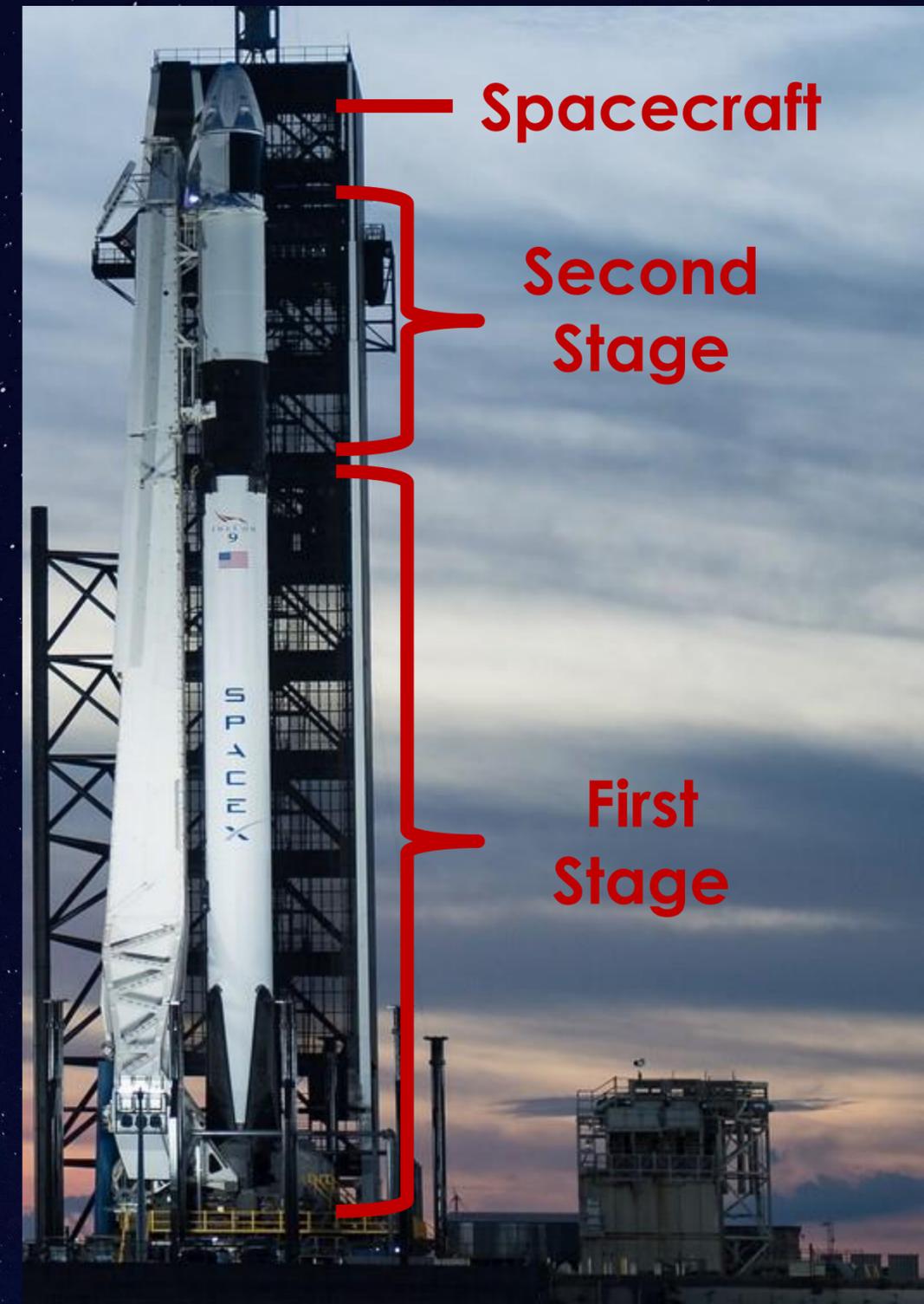
Follow along for the next 45 minutes as the rocket and spacecraft prepare for liftoff.

# “Go” for rocket fuel!

**L-minus 45 minutes:** The SpaceX Launch Director gives permission to “go” for loading fuel into the rocket.

**L-minus 37 minutes:** The spacecraft launch escape system is up and running! If there is an emergency on the pad, the astronauts will be safely launched away from the rocket in their spacecraft.

**L-minus 35 minutes:** Fuel loading begins! They are loading kerosene and liquid oxygen (LOX) into the bottom of the rocket (first stage) and kerosene into the part closer to the spacecraft (second stage).



# Writing & Sharing Activity



Imagine you are strapped into the SpaceX Crew Dragon spacecraft, ready to liftoff to the International Space Station in the next thirty minutes.

What are you thinking about in this moment before launch? How do you feel?

# “Go” for spacecraft!

**L-minus 16 minutes:** The second stage is now also getting liquid oxygen (LOX).

**L-minus 7 minutes:** The “engine chill” is beginning to keep the rocket at the right temperature.

**L-minus 5 minutes:** The spacecraft is now running on power from inside the spacecraft.



# The final countdown!

**L-minus 1 minute:** Prelaunch computer command checks and rocket pressurization begin.

**L-minus 45 seconds:** The SpaceX Launch Director says “Go for launch”.

**L-minus 3 seconds:** The engine ignites!

**L-minus 0 seconds:** LIFTOFF! We are headed to the International Space Station!



# What happens next?

**T-plus 58 seconds:** The rocket will reach peak aerodynamic pressure, or stress. This is also called Max Q.

**T-plus 2 minutes 35 seconds:** After burning through a million pounds of fuel, the first stage cuts off and separates seconds later.

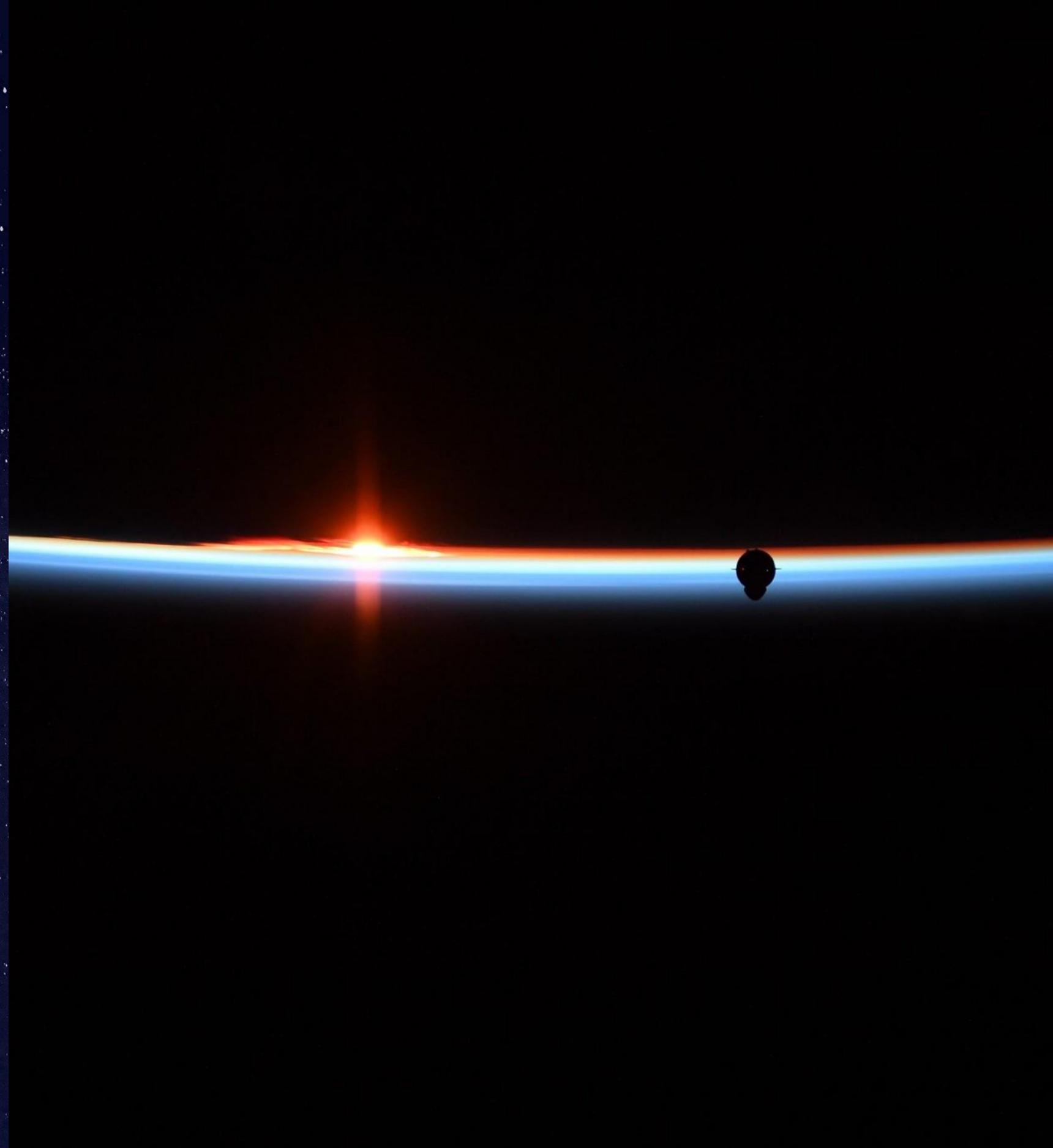


# What happens next?

## **T-plus 9 minutes 52 seconds:**

The first stage lands on a drone ship in the ocean in order to be reused later.

**T-plus 11 minutes:** The Crew Dragon separates from the second stage and makes its way to the International Space Station.



# Writing & Sharing Activity



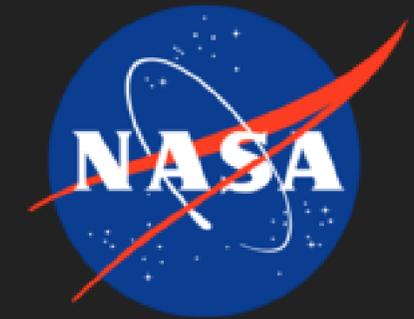
Imagine you just arrived at the International Space Station after your journey on the Crew Dragon spacecraft.

What science experiment would you conduct during your time on the station? How would you perform your experiment, and what is your hypothesis on what may happen?



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# Learn More



## CCP NEXT GENERATION STEM

Check out activities developed for the Commercial Crew Program [here](#).



## STEM ON STATION

Check out classroom resources for the International Space Station [here](#).



## NASA STEM ENGAGEMENT

Explore all of the opportunities and resources available through NASA's Office of STEM Engagement at [this website](#).