



The Space Race: It's Rocket Science

W.A.L.T: explore how
chemical reactions help
rockets lift off

How do rockets take off if they are so heavy?

Think, Pair, Share.



Rockets are really heavy!
It takes a lot of energy
to make something this
big fly. We learned in
the last lesson, that
gravity on earth really
wants to pull things down
to the ground. So how on
earth does a heavy
rocket manage to beat
the pull of gravity?



How did the rocket take off?

I think the heat from the fuel pushes it up...

I think the explosion makes it fly up in the air!

I think it takes off because...



Have you ever seen a
rocket take off? If
you have, what did
you see?

Think, Pair, Share.



If you have ever seen a rocket taking off, you probably noticed a few things. You may have noticed that there is a lot of smoke. You may have noticed that it is very loud. You may also have noticed that there is what looks like fire coming out of the rocket!





Activity Time

To understand how rockets take off, we first have to understand how balloons take off. When you are ready, take your peg off your balloon and let it fly away.



What just happened there? What made the balloon fly away?

Think, Pair, Share.



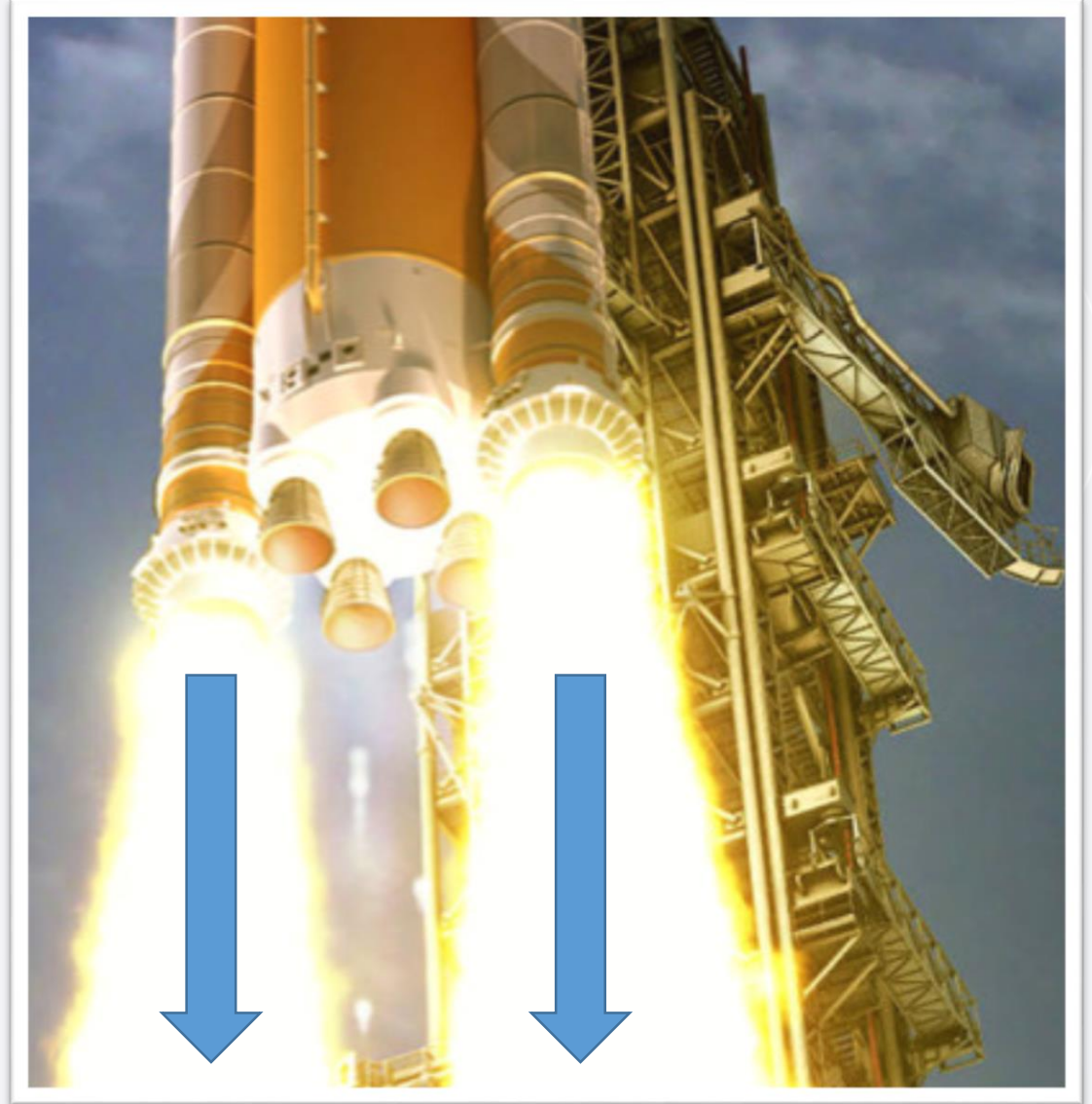
The air from inside the balloon escaped through the bottom when you let go. This air pushed the balloon through the air as it rushed out!

This is called **thrust**. Thrust is a big push that lifts something up. The same thing happens with rockets!



Instead of air, the rocket gets its thrust from fuel. Rocket fuel explodes and sends hot air flying out of the bottom of the rocket.

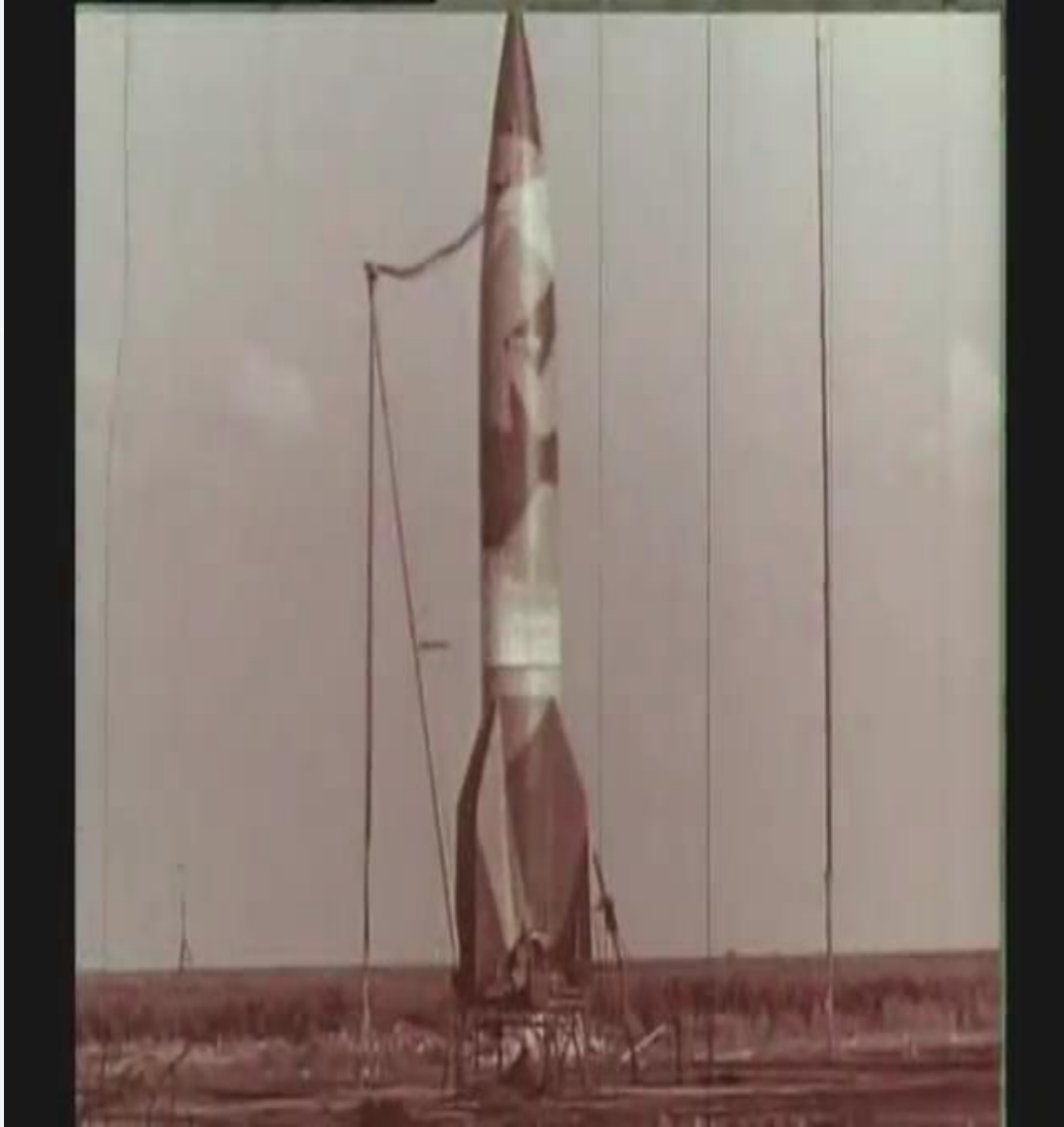
This hot air pushes against the ground and lifts the rocket off into space.



But how on earth does
the fuel explode in the
first place?

Think, Pair, Share.





Inside of the rocket, a big **chemical reaction** takes place. There are lots of ways of getting chemicals to react with each other. Adding heat is one way to make a chemical reaction. Another way is by mixing different chemicals together.

What do you think is going to happen when we mix these two chemicals together?

Think, Pair, Share.



When our chemicals reacted with each other, they produced a gas. There isn't enough room in the bag for the liquids and all the new gases. This gas was trapped inside the bag and eventually needed to escape! That caused the explosion.



The amounts of each chemical mixed makes a big difference to how explosive the reaction will be.

Today, you will be working with some explosive chemicals. What safety tips do we need to follow?



SAFETY BRIEFING

THESE SAFETY TIPS MUST BE FOLLOWED:

- **DO NOT PUT YOUR FACE OVER THE CHEMICAL REACTION.**
- **ONLY ONE PERSON SHOULD PUT THE LID ON THEIR CONTAINERS.**
- **DO NOT RUB YOUR EYES AFTER HANDLING CHEMICALS**
- **DO NOT EAT OR SNIFF THE CHEMICALS**

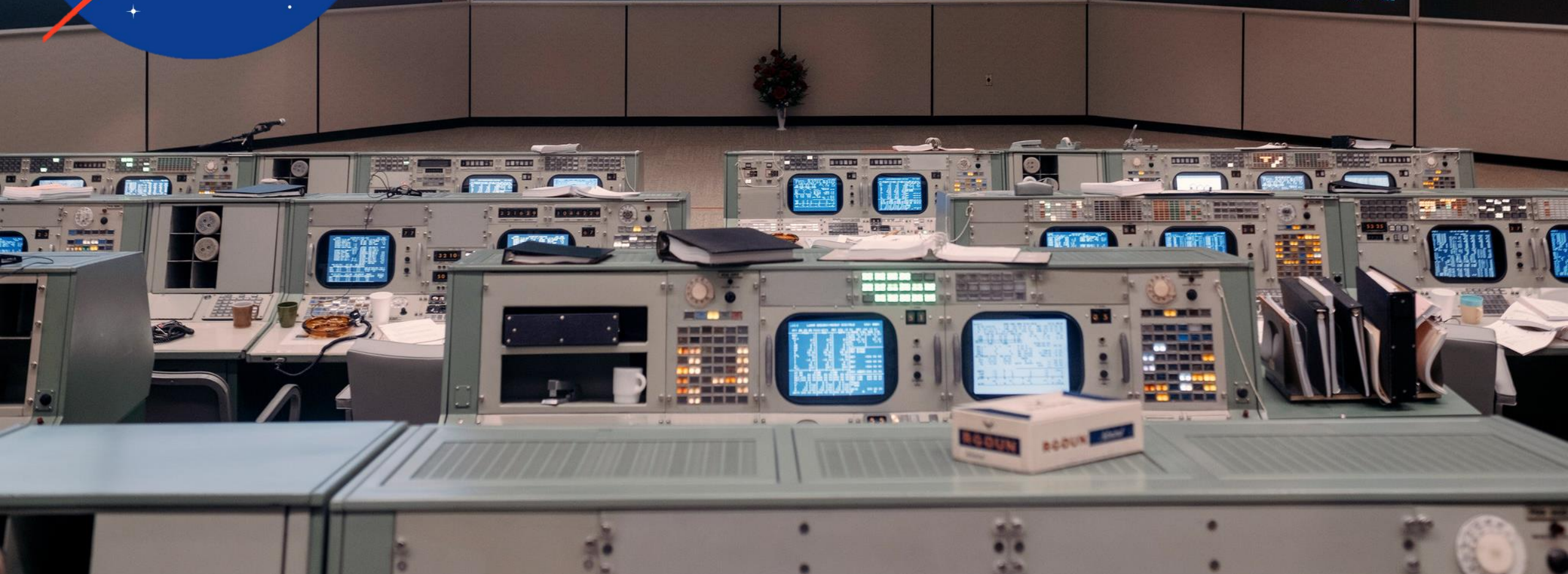
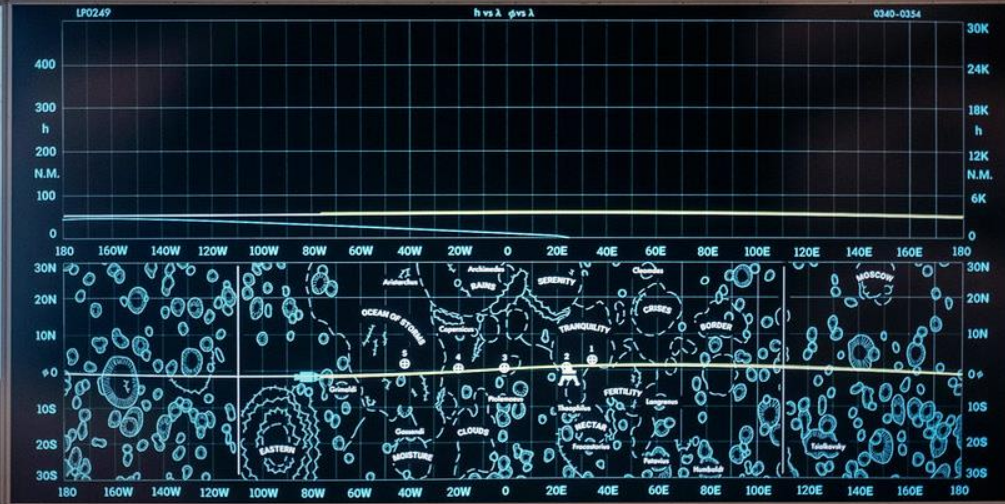
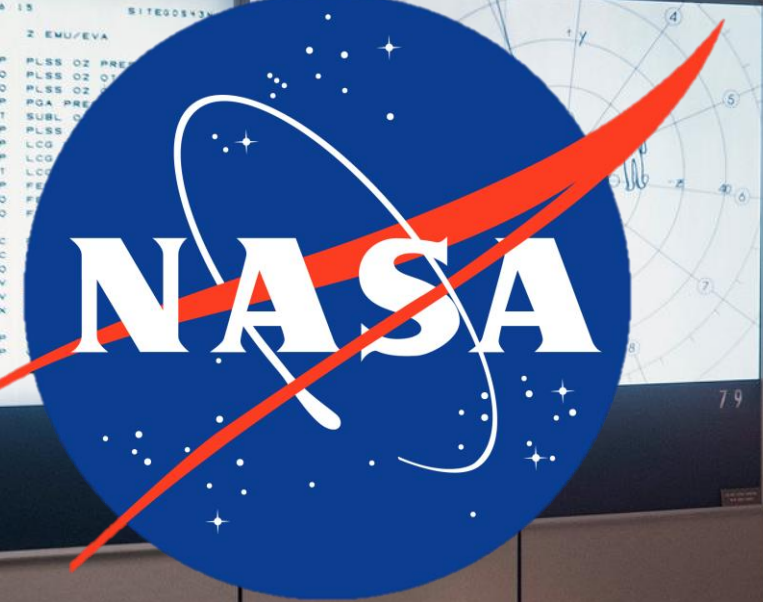
Activity Time

It's time to head back in time. You're going to need to bring all your knowledge of rocket fuel and chemical reactions with you to complete this challenge!

Are you ready?











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TOP SECRET BRIEFING

DESIGN AND MAKE THE MOST POWERFUL ROCKET FUEL POSSIBLE WITH THE CHEMICALS PROVIDED

- **YOU CAN ONLY USE THE MATERIALS PROVIDED.**
- **YOU MUST FOLLOW SAFETY PROCEDURES AT ALL TIMES.**
- **YOU CAN MAKE 3 DIFFERENT ROCKET FUELS.**
- **YOU MUST WORK AS A TEAM ON THIS CHALLENGE.**
- **YOU MUST RECORD YOUR FINDINGS ON YOUR SHEET**