

Lesson 5: SpaceX Rocket Engines

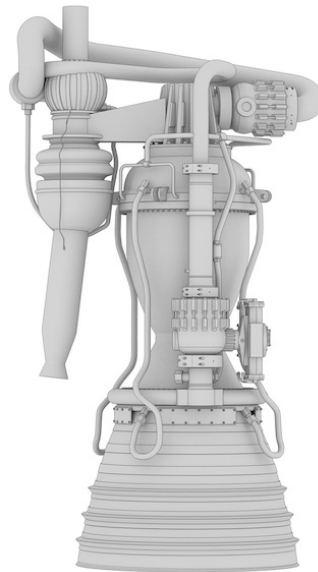
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VOCABULARY

1. booster
2. chamber
3. combustion
4. cooling loop
5. engine
6. exhaust
7. explode
8. Falcon 9
9. liquid
10. kerosene
11. methane
12. mixed
13. nozzle
14. pump
15. stage



READ

SpaceX rocket engines use liquid oxygen mixed with kerosene. This is very dangerous because it can explode very easily. Rocket engines are much more powerful than jet engines because they use liquid oxygen. Kerosene and liquid oxygen are pushed into the combustion chamber by two super-powerful pumps. The thing on the left side of the engine is part of the pump motor. When kerosene and liquid oxygen go into the combustion chamber they explode and the exhaust goes out the nozzle at the bottom of the engine. The nozzle gets very hot so kerosene is pumped around it to help keep it cool. You can see the cooling loop that goes around the nozzle in the photo.

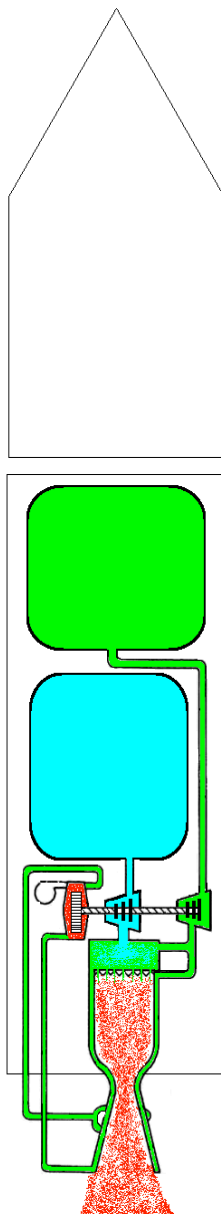
This photo shows Elon Musk standing next to one of the engines used in the Falcon 9 rocket. The Falcon 9 uses 9 of these engines in the booster stage. It uses one of these engines in the second stage. If one engine stops working the other 8 engines have enough power to let the rocket go up into space. The giant rocket that will go to Mars will use 31 engines that are even bigger than this one. Those engines will burn methane instead of kerosene because methane is more powerful.

DISCUSSION

1. Why do rocket engines need liquid oxygen?
2. What is kerosene?
3. Why do rocket engines use such dangerous fuel?
4. Why do rocket engines need two powerful pumps?
5. Why are the pumps so powerful?
6. What does the nozzle do?

DRAW**Liquid Fuel Rocket**

This drawing shows the main parts of a liquid fuel rocket engine. Write a number next to the part.



1. Combustion Chamber
2. Booster Stage
3. Nozzle cooling loop
4. Exhaust
5. Kerosene Tank
6. Kerosene Pump
7. Liquid Oxygen
8. Liquid Oxygen Pump
9. Nozzle
10. Second Stage
11. Pump motor