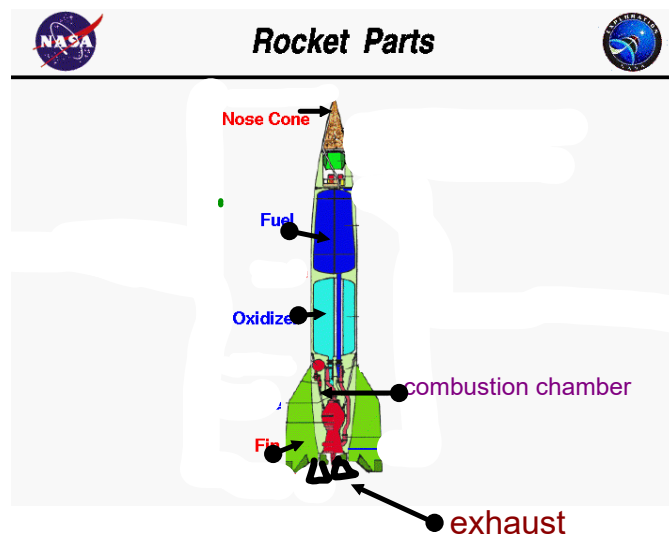


## The Rocket Works

Most rockets today are liquid fueled. They work by combining two liquids in a sealed chamber. When the liquids come into contact with each other, they burn violently, turning into explosive gases. These gases have no place to escape except out the back of the rocket through the nozzle. These gases pushing backwards causes the rocket to go forwards, following Newton's Third Law. Remember, it is the same as a person on a skateboard pushing backward on the ground to go forward.



Fins are used to keep the rocket moving straight.

Some rockets are multistage. meaning they have three separate rockets piled on one another. When the fuel in the bottom stage is used up, it separates from the rest of the rocket and discarded.

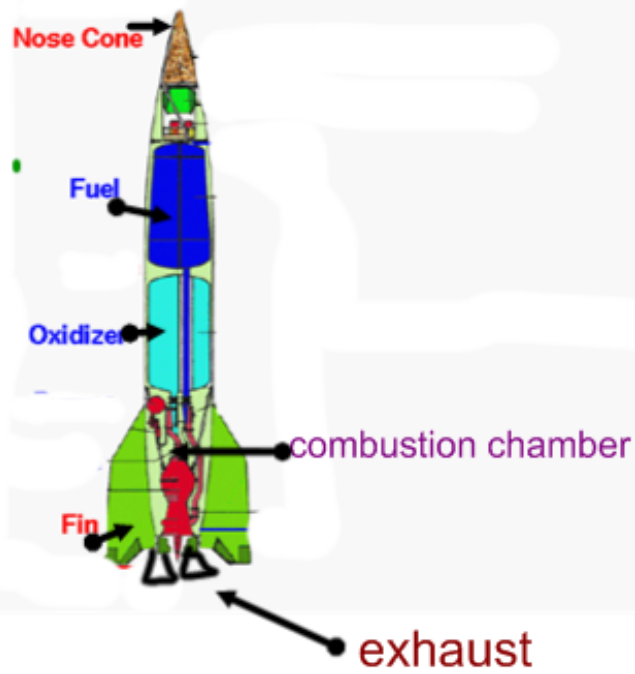
Since the rocket is now lighter it can go faster.

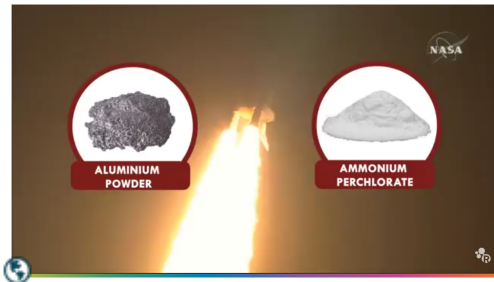
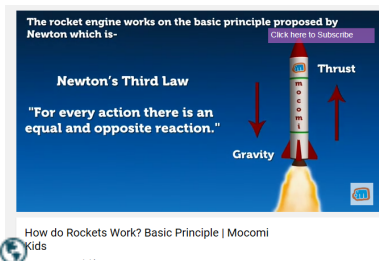
- Rockets have more than 2 gas tanks
- once one is used (at the bottom) then that part of the rocket breaks off
- Makes rocket lighter



Draw a sketch of the rocket

### Rocket Parts





### Main difference of an Aircraft and Spacecraft

Aircraft fly through air and spacecraft fly in space.

In space, there is no air, so a spacecraft cannot be designed the same as an aircraft. There won't be drag or lift, so planes cannot fly.

A spacecraft will need to rely on thrust to maneuver safely.

Spacecraft have to carry their own air along which is called an oxidizer, since there is no air to make the engines work. That's why jet engines can't work in space, so rocket engines must be used instead.

Copy as a chart but with underline words only

**Main difference of an Aircraft and Spacecraft**

	<u>Aircraft</u>	<u>Spacecraft</u>
<u>Lift</u>	<u>Aircrafts generate thrust</u> → <u>wings</u> → <u>motors</u>	Rocket boosters and <u>three main engines</u> that burn oxygen and hydrogen
<u>After Lift-Off</u>	_____	The <u>fuel tanks detach</u> from the shuttle, attached to two parachutes to land safely to the ground.
<u>Essential materials needed to survive during the flight</u>	Usually <u>nothing is required</u> , except for snacks and drinks, while on board a plane	All the food, oxygen, water, toiletries needed for the duration of the trip, are stored on the space shuttle
<u>Re-entry into the Earths atmosphere</u>	<u>Not necessary</u>	The <u>shuttle is moving so fast</u> . <u>large amounts of heat</u> are generated from the friction of the air molecules against the shuttle exterior. There are <u>reinforced carbon wings</u> , high temperature <u>surface insulation tiles on the fuselage and around the windows</u> and low temperature white tiles on the remainder of the space ship.
<u>Landing</u>	The <u>plane creates more drag than thrust and allows for gravity</u> to take over.	Since the <u>shuttle "dropped" its fuel tanks</u> during the trip out of the Earths atmosphere, it <u>does not have any fuel to fly it</u> . This means the <u>shuttle is a large glider and lands without the assistance of fuel</u> and must maneuver itself using the flaps, ailerons, rudder and elevators.

## Famous Aviators

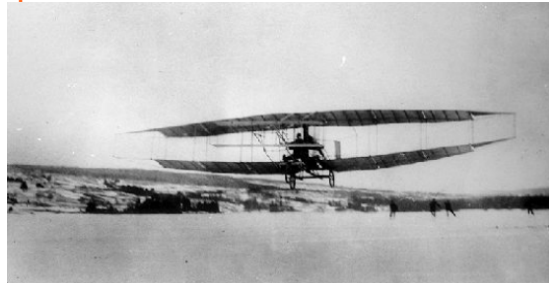
### 1) John McCurdy - flew the first heavier-than-air vehicle in CANADA

Back in 1909 the flight of this aircraft made Canadian history when John A. McCurdy flew it for over half a mile above the frozen surface of Bras d'Or Lake at Baddeck Bay, N.S.



-tested 200 short flights in experimental planes before being successful.

- Successful plane's name "Silver Dart"



J.A.D. [MCCURDY](#) was the principal designer and pilot; Glenn H. Curtiss developed the water-cooled engine, an advance on the association's earlier experiments. Pulled on to the ice of Baddeck Bay by horsedrawn sleigh on Feb 23, the silver-winged machine rose on its second attempt after travelling about 30 m, flying at an elevation from 3 to 9 m at roughly 65 km/hr for 0.8 km. Over 100 of Bell's neighbours witnessed the first flight of a British subject anywhere in the Empire. The Silver Dart flew more than 200 times before being damaged beyond repair upon landing in the soft sand of Petawawa, Ont, during military trials in early Aug 1909. The engine was later retrieved and restored and is now on display at the National Museum of Science and Technology in Ottawa. A full-scale model of the Silver Dart may be found in Ottawa's National Aviation Museum

2) Billy Bishop - Billy Bishop was Canada's top flying ace of the First World War, and was officially credited with 72 victories.



Bishop, Billy

3) Rosella Bjornson - First Female airline pilot in April 1973



4) Marion Orr - First women in Canada to open a flight school



Heritage Minutes: Marion Orr

more info




5) Jimmy Doolittle - American aviator and army general Jimmy Doolittle led an air raid on Tokyo and other Japanese cities four months after the Japanese attack on Pearl Harbor. April 18, 1942

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

 Jimmy Doolittle - video 46 min

<https://www.youtube.com/watch?v=JnZ21kLIKbE>

 <http://www.bing.com/videos/search?q=jimmy+doolittle&&view=detail&mid=2C0E65DFD437E401E74B2C0E65DFD74B&FORM=VRDGAR>





6) Amelia Earhart, the first female pilot to fly across the Atlantic Ocean,  
mysteriously disappeared while flying over the Pacific Ocean in 1937.



7) Neil Armstrong - first civilian pilot to fly in space.