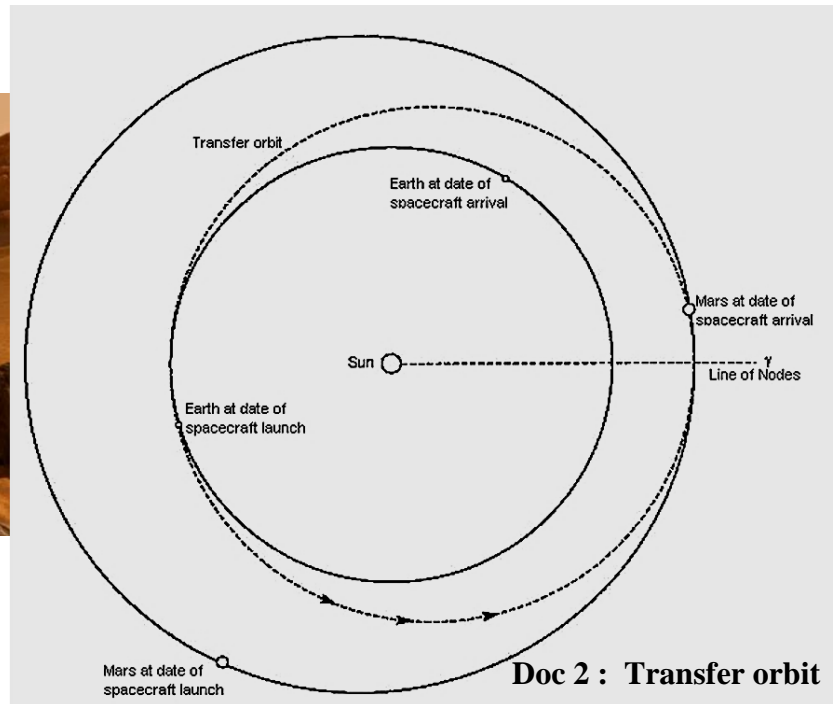


Sujet 1

LET'S GO TO MARS !



Doc 1 : The curiosity rover



Doc 2 : Transfer orbit

	Mass (kg)	Radius (km)	Mean surface temperature	Atmosphere (surface pressure)	States of water
Earth	6.0×10^{24}	6380	+14 °C	Oxygen and nitrogen (1×10^5 Pa)	S, L, G
Mars	6.4×10^{23}	3380	-63 °C	Mostly carbon dioxide (6×10^2 Pa)	S, G

Doc 3: Comparative informations on Mars and Earth

Mars Science Laboratory (MSL) is a robotic space probe mission to Mars launched by NASA on November 26, 2011. It successfully landed a rover (Doc 1) on August 6, 2012.

The rover, named “Curiosity”, has a mass of 899 kg and can travel up to 90 m per hour. It is equipped with a suite of 10 instruments and even a laser to research the Martian past.

The MSL mission has four scientific goals : determine the landing site's habitability including the role of water, the study of the climate and the geology of Mars. It is also a useful preparation for a future manned mission to Mars by 2030 -2040.

When astronauts land on Mars, they'll have to adapt themselves to new living conditions (Doc 3). For instance, the strength of the gravitational field on Mars is 3.9 m.s^{-2} when it's 9.8 m.s^{-2} on Earth. Therefore, some of their muscles will atrophy, their bones will become more fragile and blood circulation will be disturbed too. Ready for the journey?

QUESTIONS:

- 1) Present and comment on this document.
- 2) How long does it take to go to Mars? Why is the trajectory a curve and not a straight line (Doc 2)?
- 3) How different are the living conditions on Mars compared with the ones on Earth ?
- 4) Do you think a manned mission to Mars is possible? (think of the duration, equipment, living conditions, cost...).
- 5) What could be the purpose(s) of a manned mission to Mars? Would you join the journey?