

EXAMEN : Baccalauréat général - Série S-SVT ou S-SI	Session 2013
ÉPREUVE : Evaluation spécifique de Langue en section européenne	
<b>PHYSIQUE-CHIMIE en langue ANGLAISE</b>	
Thème : « Mécanique : lois de Newton et de Kepler »	<b>Sujet n°18</b>

### Let's go to Mars!

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

The Curiosity rover (Figure 1) has a mass of 1,980 lb (899 kg) and can travel up to 300 ft (90 m) per hour. The six- wheeled robot is carrying 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 auseful 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 (Figure 2). For instance, the strength of the gravitational field on Mars is  $g = 3.9 \text{ m.s}^{-2}$  when it's  $9.8 \text{ m.s}^{-2}$  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?

Fig 1: The Curiosity rover

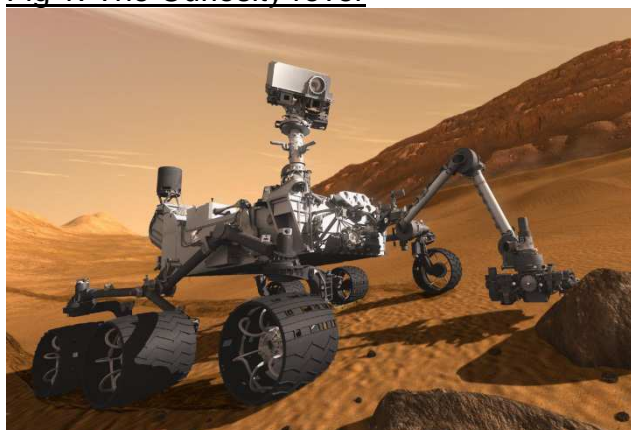


Fig 2:Comparative information on Mars and Earth

	Mass (kg)	Radius (km)	Mean surface temperature (°C)	Atmosphere
Earth	$6.0 \times 10^{24}$	6380	+14	Oxygen and nitrogen
Mars	$6.4 \times 10^{23}$	3380	-63	Essentially carbon dioxide

From [www.nasa.gov](http://www.nasa.gov) and <http://en.wikipedia.org>

### QUESTIONS

1a- Present and comment on the document.

1b- Using the table above and your personal knowledge, explain why an object is more subject to the attraction of Earth than that of Mars.

2- Should we send humans to Mars?